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EFFECTS OF MATERNAL UNDERNUTRITION UPON THE NEWBORN INFANT IN HOLLAND (1944-1945)

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THERE has been a recent awakening of interest in nutrition during pregnancy as it may affect the fetus, and thus, the newborn infant.[1-4] Most publications have given highly suggestive evidence of a definite relationship, stressing the obvious importance to the field of preventive medicine. Critical analysis, however, indicates that certain links in the chain of evidence are not as strong as they ought to be. The great difficulty is to construct experimental situations producing incontrovertible proof that undesirable results of human pregnancy, either maternal or fetal, are direct consequences of maternal dietary factors. The substance of this difficulty is stated by the proposition that women who eat poor diets may well be suboptimal individuals in various other ways, as in heredity, environment, and past history of disease.[5] Thus, when the statement is made that "If the diet of the mother during pregnancy is poor to very poor, she will undoubtedly have an infant whose physical condition will be poor,"[6] we still need proof that the infant's condition is the *result* of the mother's diet, soundly based as the quotation would otherwise seem to be. Or, if maternal malnutrition cannot be shown to be the sole cause of the fetal subnormality, we should like to know the relative degree of its influence.

There are at least four ways of securing data which may help to clarify these relationships. The simplest, though obviously suitable for animal investigation only, is the calculated restriction of maternal intake during pregnancy. Warkany's use of this method has been brilliantly successful in demonstrating an undoubted causal relationship between inadequate diet and fetal malformations. But so extremely limited is the diet required in such experiments,[7,8] that the maternal animal must be fed and treated with the utmost care, lest she fail to produce any offspring whatever. A second method is that of accurate

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The studies being reported, as well as the author's trip to Holland, were a part of a continuing research project, financed by the Nutrition Foundation, New York City, and conducted by the Department of the Maternal and Child Health, Harvard School of Public Health, at the Boston Lying in Hospital, in collaboration with the Department of Obstetrics, Harvard Medical School.

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analyses of diets voluntarily consumed by pregnant women, with later comparison of the maternal nutritional status with the outcome of pregnancy. This demands highly painstaking work, a consistently objective attitude, and a great deal of time, because so many pregnancies result satisfactorily that a large number must be studied before a statistically significant group of complications or catastrophes emerges. In the hands of several workers, notably Burke and her colleagues,[1, 6, 9-11] the results of such studies have been highly suggestive. A definite drawback is, again, that a group of other conditions unfavorable to the pregnancy or the fetus may be present along with improper food habits.

A third procedure, the reverse of the first, employs the directed dietary improvement of an experimental group of women, whose pregnancies are then contrasted with those of a control group not so manipulated. This, if large enough numbers are employed, complete objectivity maintained, and *the two groups exactly comparable in all aspects except the nutritional,* would perhaps be the most informative procedure. For reasons to emerge below, the ideal program for such a procedure would select the two groups at the very onset of pregnancy, if not before. The papers of Ebbs and Tisdall,[12, 13] the report of the People's Health League,[14] and that of Balfour[15] in England, were based on this general plan. Again, the results indicated that supplementing maternal diet with vitamin concentrates, minerals, and proteins in various combinations was followed by decline in the frequency of miscarriages, premature births, stillbirths, neonatal deaths, and toxemia of pregnancy.

A fourth plan is that of observing the effects of widespread nutritional inadequacy due to war or other calamity affecting an entire populace. This type of study takes advantage of a period of starvation as an unhappy but nevertheless potentially serviceable human experiment somewhat like those conducted with animals in the first type listed above. Statistics from the pre- and post-starvation periods furnish the only possible controls. The observations to be reported in the present communication were made upon this basis. The investigation concerned the infants born to women in Rotterdam and The Hague before, during, and after the hunger period, which began in the autumn of 1944 and terminated with the liberation of the northwestern Netherlands in May of 1945.

It was realized that while such a study offered the quick accumulation of a large amount of material, it sacrificed the accuracy of individual and dietary histories as obtained under the second method listed above. This seemed allowable if the nutritional stringency could be shown to have been sufficiently general to involve practically all women in the clinics studied. It was also clear that the results of maternal undernutrition would be measurable only insofar as they affected the infant up to the time of birth. Evaluation of infant mortality in relation to maternal diet could not be estimated under the abnormal environmental conditions into which infants were born during the critical period.

The cities of Rotterdam and The Hague were selected as having suffered as badly as any others, and offering two active maternity clinics with presumable reliable records. Amsterdam, the other great city of northwestern Holland, was not directly investigated because the same problem was under attack there by

Dr. G. K. Levy of that city. The study was begun Dec. 15, 1945, after a stop in England en route to discuss with Dr. Hugh Sinclair of the Oxford Nutrition Survey, the food situation which had obtained in Holland. Dr. Sinclair and Dr. F. J. Stare of Harvard University had both been in Western Holland immediately after the Liberation for purposes of evaluating the nutrition status before that event.[16, 17] Both of them gave indispensable assistance.

THE NUTRITIONAL BACKGROUND

The entire value of the project depended upon knowledge that the area studied had suffered such severe malnutrition as to involve the majority of pregnant women. Investigation indicated that this was the case. The specific reason for nutritional stringency in northwestern Holland was the general transportation strike against the Nazis which began Sept. 17, 1944, at the request of the Dutch Government in London, and at a time when it seemed that this part of Holland would shortly be liberated. This expectation was not fulfilled, but the strike held for the entire period until liberation in May, 1945. During this period, aptly called the hunger winter, little or no food was transported into the major cities. Other necessities of life such as fuel were also not moved, so that heat, gas, and electricity were decreasingly available. The Germans saw the resulting hardships to the Dutch as weapons which might persuade them to drop the strike, and therefore guarded the roads and canals approaching cities so that little could be smuggled in. Under the circumstances, it was possible for country dwellers to live without much distress while urban populations only a few miles away were literally starving.

Data indicating the nutritional situation as accurately as it could be recorded are shown in Fig. 1 and Tables I to III. The official distribution of food for various age groups of the populace is shown in Fig. 1, prepared by the Royal Bureau for Food Distribution in War Time. This indicates the progressive decline of food supplies in the autumn of 1944, the rough plateau reached from January to April, then a slight increase, particularly devoted to the rationing for infants, and the sharp elevation coincident with the liberation in May.

A rough idea of the resulting effect upon general health may be inferred from figures giving the deaths for all ages and sexes attributable directly to undernutrition as shown in Table I. These figures were obtained from the Municipal Bureaus of Statistics in the cities indicated.

TABLE I. DEATHS FROM UNDERNUTRITION, AT ALL AGES*

MONTH	THE HAGUE ± 500,000†	ROTTERDAM ± 650,000	AMSTERDAM ± 700,000
January, 1945	173	125	Nov. 1, 1944 to
February	552	548	July 1, 1945,
March	644	837	2,351
April	442	843	
May	244	244	
June	90	–	
Weekly to May	104	136	

*From municipal records.
†Population.

The official figures upon food distribution for pregnant women (kindly furnished by Dr. Dols and Dr. van Arcken of the Directory of Food Distribution, Ministry of Agriculture) are given in Table II for representative periods from December, 1943, to December, 1945. These are averages calculated for the entire famine-stricken area. According to these figures, a low point of about 1,145 calories and 34 Gm. of protein per day for expectant mothers was reached during January of 1945, with a slight rise by April. Investigation has revealed a great deal of variation in the availability of extra rations for pregnant women; at times the status was better than that indicated, at other times (particularly as hunger progressed) it became worse. It is also abundantly clear that most adults receiving extra rations shared them with their families.

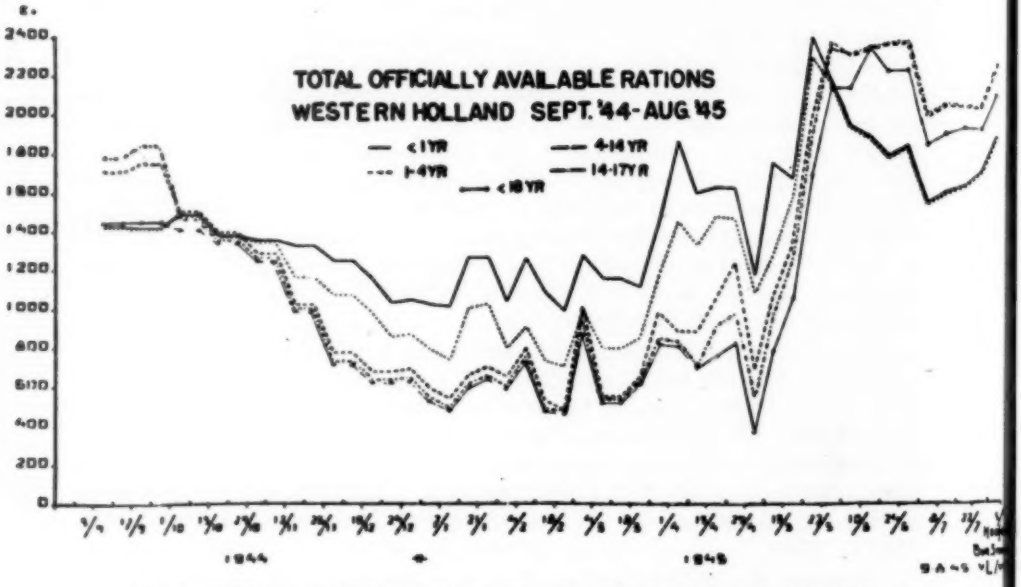

Fig. 1.—Rations available in calories per day. The decline began in October, 1944, the low point was reached in early January, 1945, and the situation remained generally bad until the sharp rise on May 15, 1945.

As the lines show, the most food was distributed to the youngest infants, the least to adults. Distribution to pregnant women is shown in Table II.

An attempt made by Dr. Sinclair to evaluate as precisely as possible the nutritional elements actually available to pregnant women in the cities of The Hague and Leiden,[16] is shown in Table III. Since this was prepared on the ground very soon after the Liberation, since numerous local authorities were consulted, and because of Dr. Sinclair's position as leader of a team of official investigators, it may be taken as representing as close an approximation as may be obtained. There was general agreement that the status in Rotterdam closely paralleled that of these cities.

TABLE II. OFFICIAL RATIONING TO PREGNANT WOMEN, WESTERN HOLLAND

PERIOD	CALORIES PER DAY	PROTEIN (GM.)	CARBOHYDRATE (GM.)	FAT (GM.)
December, 1943	2,353	67	481	54
July, 1944	2,109	63	342	48
October, 1944	2,099	62	331	51
January, 1945	1,144	34	177	29
April, 1945	1,427	35	215	42
July, 1945	2,546	78	344	91
October, 1945	2,808	87	428	76
December, 1945	3,042	94	456	85

TABLE III. NUTRITION AVAILABLE FOR PREGNANT WOMEN (THE HAGUE AND LEIDEN)*

ITEM	RECOMMENDED DAILY ALLOWANCES†	SEPTEMBER, 1944	FEBRUARY, 1945	APRIL, 1945
Calories	2,500	1,925	731	912
Grams protein (vegetable)	85	38	24	28
Grams protein (animal)	85	23	9	11
Grams fat		50	11	14
Milligram calcium	1,500	1,075	649	517
Milligram iron	15	16.3	9.6	10.7
I.U. vitamin A	6,000‡	1,260	445	766
Milligram thiamin	1.8	1.1	1	0.6
Milligram niacin	18	9.2	3.0	4.1
Milligram riboflavin	2.5	1.2	0.5	0.5
Milligram ascorbic acid	100	59	34	53

*From evaluation by H. M. Sinclair, Oxford Nutrition Survey, for Supreme Headquarters Allied Expeditionary Force.

†Food and Nutrition Board, 1945.

‡Two-thirds carotene, one-third vitamin A.

One may sum up all these data in the following observations:

1. The background was one of generalized undernutrition rather than selective malnutrition. Intakes of total energy, that is, calories from all sources, were about as depressed as were individual elements. With the exception of ascorbic acid and, perhaps, thiamin (see Table III) all items of nutrition were reduced in a roughly parallel fashion, no single one being individually much lower than others.

2. The period of severe undernutrition was of brief duration. A full-term pregnancy terminating upon the last day before relief arrived would have begun under relatively good nutrition circumstances; a pregnancy in which embryonic organogenesis occurred under starvation condition in March and April would have terminated after several months of greatly improved maternal diet in November or December.

3. The populace involved had been fairly well fed up to the time of rapid deterioration in food supply.

4. The large cities were much worse off than nearby rural areas.

5. Although intelligent and painstaking attempts were made to support pregnant women by extra rations, that class was still supplied with far less calories, protein, calcium, vitamin A, niacin, and riboflavin than the allowances recommended by the Food and Nutrition Board of the National Research Council (Table III). For iron and thiamin, the deficits were less marked.

6. Relief was general, comparatively sufficient, and very abrupt.

The foregoing statements indicate that in certain important ways, the unfortunate subjects of this "nutritional experiment" in Holland were very different from those recently studied in American and English cities.[2, 5, 6, 12, 14, 15, 18, 19] In the latter type of material, the subjects are usually women who have eaten bad diets more or less all their adult lives, and in whose diets a few elements are particularly defective while the total caloric intake is more or less sufficient.

Testimony to the singularly abrupt, severe, and widespread character of the Dutch nutritional shortage is furnished by the prevalence of amenorrhea during the hunger months. This occurred in about 50 per cent of the female inhabitants of the cities studied, and disappeared promptly after the return of food. Reasons for believing that its cause lay in general caloric (and, perhaps especially protein) underfeeding will be presented in another publication.[20] The conception rate fell sufficiently to reduce the births at nine months later to about one-third of the usual figure (Table IV). Shortly after the first of March, 1946, the birth rate rose to unprecedented proportions, a fact correlated with the return of food in May, 1945.

TABLE IV. BIRTHS, CITY OF ROTTERDAM, TO SHOW DECLINE IN CONCEPTIONS DURING HUNGER*

YEAR	AVERAGE NUMBER BIRTHS PER WEEK IN					
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
1939	*Weekly average*, 206					
1944	228	214	234	231	227	227
1945	228	262	241	270	230†	199‡
	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.
1939	*Weekly average*, 206					
1944	228	227	245	238	218	210
1945	191§	157‖	112¶	84**	87**	89**

*Figures from graph furnished by Municipal Bureau of Statistics.
†Conceived in August, 1944.
‡Conceived in September, 1944 } Food supply deteriorating.
§Conceived in October, 1944 }
‖Conceived in November, 1944.
¶Conceived in December, 1944.
**Conceived in Jan., Feb., March, 1945. Food at low level.

MATERNAL NUTRITION AND NEWBORN INFANT SIZE

The size of the infant at birth was mainly studied by a review of records from the Midwifery (Vroedvrouen) School in Rotterdam.* As controls, figures were first obtained from 560 births at that institution in the prewar winter of 1938-1939, and 589 in the winter of 1943-1944. This second control period was included to represent the conditions of a wartime winter preceding the one of nutritional stringency. The percentile distribution of birth weights in these two control periods was practically identical, and was in fact very similar to that for Boston infants. It therefore appeared that any deviation from expected birth weights during the hunger-winter of 1944-1945 could be ascribed to nutritional factors. It was also determined that no significant change had occurred in maternal age or parity between these control periods and the hunger period.[20]

*Records from the Obstetrical Department of the Zuidwal Hospital at The Hague were also studied. These were a numerically smaller group but displayed the same tendency. They will be presented in another communication.[20]

Since the data were obtained some months after the liberation, it was possible to trace changes in birth weight distribution not only through the hunger-winter of 1944-1945, but also through the seven and one-half months immediately following the return of food.

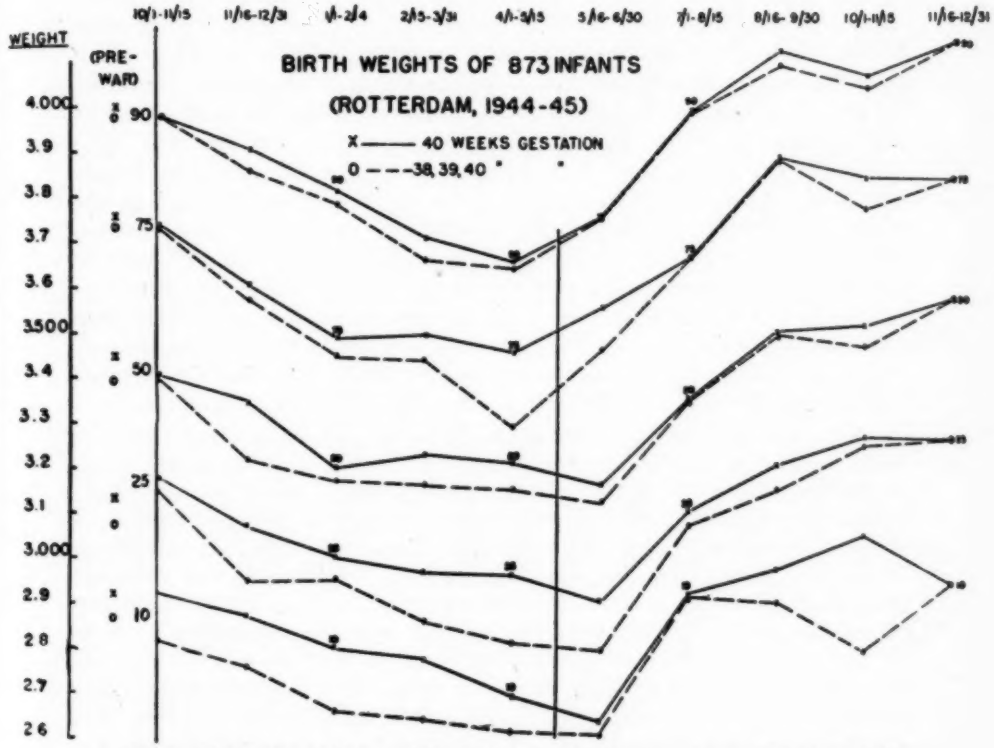

Fig. 2.—Distribution of birth weights during and after hunger-winter. Weights of babies born in ten successive periods of six weeks each from Oct. 1, 1944, to Dec. 31, 1945, are displayed by the nintieth, seventy-fifth, fiftieth, twenty-fifth, and tenth percentile. (The fiftieth percentile represents the weight of the infant midway between the lightest and heaviest in each period; the infant at the quarter mark from lightest to heaviest is represented by the twenty-fifth percentile, and so on.) Separate percentiles have been calculated for infants supposedly of at least forty weeks' gestation (solid line), and for those of at least thirty-eight weeks' (broken line). On the left are percentiles for babies born at the same institution in prewar times.

In Fig. 2 are set forth the ninetieth, seventy-fifth, fiftieth, twenty-fifth, and tenth percentiles indicating the range of birth weights of 873 infants born during ten successive periods of one and one-half months each, five of which were before, and five after, the relief of hunger in mid-May. To reveal any influence of prematurity as a cause of smallness in fetal size, percentiles were calculated first for all infants recorded as of forty weeks gestation, and second, for all those of thirty-eight weeks and over. Menstrual irregularities caused calculations by dates to be even less trustworthy than is commonly the case; never-

theless the generally parallel course of lines connecting these two groups of percentiles in Fig. 2 indicates that change in weight was not simply a result of shortened sojourn in utero.

Study of the diagram indicates that at the beginning of the hunger-winter (period from October 1 to November 15) the percentiles were practically the same as those of Rotterdam babies in prewar times. Then began a progressive decline in weight. At the fiftieth percentile (median), which is the line of greatest statistical significance, this was steepest in the next two periods, or during the first three months of undernutrition. From February 14 to liberation at May 15, these fifty percentile lines decline very little. The fact that birth weight did not continue to fall at the same rate throughout the entire hunger period may indicate that an irreducible low point had been reached by the middle of February. More probably it testifies to the fact that maternal nutrition affects the weight of the fetus during the last half or last trimester of pregnancy only. In other words, the average fetus which lives for a full nine months in a malnourished uterus may be little or no smaller at birth than one which spends only the last three to four and one-half months under such conditions. Indeed the effect of maternal caloric intake upon fetal weight would appear to be slight at any time earlier than the sixth month of gestation.

The fact of change in birth weight is perhaps of more interest than its amount. The net change was about 240 Gm. (8 oz.) at the median. At all percentiles the amount of decline represented between 8 and 9 per cent of the weight in normal times, the percentage being only slightly greater in the heavier infants represented by the ninetieth percentile than in the light ones of the tenth percentile. Stated otherwise, both big and small infants showed a decreased birth weight of almost the same degree in proportion to the expected birth weight for normal times. It should be stated that this entire phenomenon of birth weight decline, though of statistical significance, was apparent only when infants were analyzed by groups. Many instances were encountered of mothers losing weight in late pregnancy and yet producing infants of 3.5 kg. or more. The observer who is not persuaded of any relation between maternal nutrition and fetal weight may easily find individual cases substantiating his belief.

The return of food was reflected more promptly by babies at the upper end of the weight scale than at the lower (Fig. 2). In general, the greatest degree of change again occurred in the first three months, or between May 16 and August 15. Even though the food situation for pregnant women in November and December, 1945, was supposedly not better than that of 1939, it is noteworthy that infants born in the last months of 1945 were about 200 Gm. heavier, at the mean, than were those of prewar times. The question arises as to whether the maternal body had become in some way a more efficient provider of food (or the fetus a more efficient parasite) through the experience of undernutrition before and during early pregnancy.

Measurements of birth length had been made by hospital nurses unaware that they would later be utilized for statistical analysis. There is reason to believe the methods were not conducive to great accuracy and therefore the

results are open to some question. They are shown in Fig. 3, which indicates the percentage of infants in four ranges of stature. At the top of each column, where the total number of infants in the group is recorded, it will be noted that the numbers are decidedly smaller in the later post-hunger periods. This reflection of the decline in conception during hunger makes statistical comparison from one period to the next rather uncertain. There is a statistically significant increase in percentage of short babies born in the hunger months as

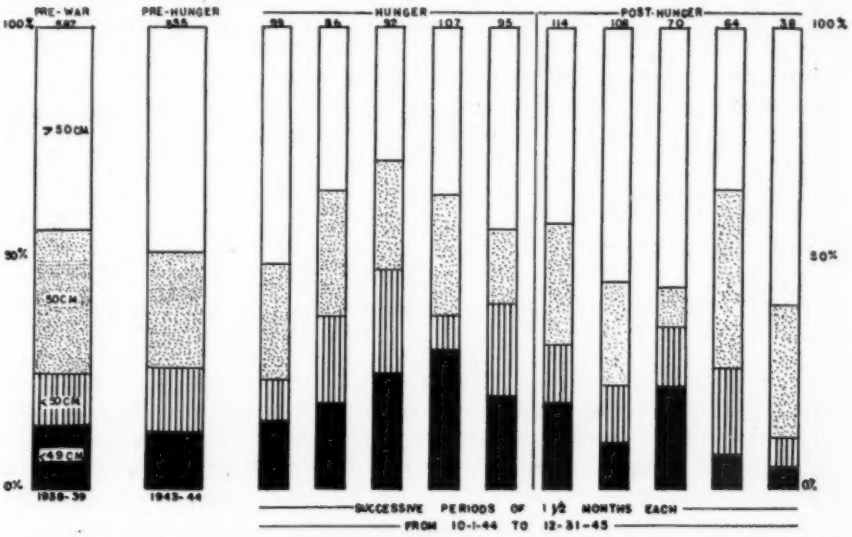

Fig. 3.—Birth length: in first column, during a prewar year; in second, during the winter previous to that of hunger; then by successive periods of six weeks each, the first five of which were during the hunger-winter, the last five, after it.
Clear part at top, per cent of infants longer than 50 cm.
Stippled areas, per cent of infants of 50 cm.
Solid black at bottom, per cent of infants less than 49 cm.
Number of infants in group shown at top of each column.

compared with those of pre- or post-hunger times, but a smooth change from period to period as maternal undernutrition developed (or was relieved) does not occur. There are evidences of a progressive trend toward short babies, especially in the first four and one-half months after hunger began, but the resulting levels are not maintained. One may say only that in terms of the data obtainable, a significant effect of maternal nutrition upon fetal length did occur. That this is not so definite as the weight change is explainable by factors mentioned above plus the principle that weight gain is a three dimensional process, while gain in length is a single dimension only.

OUTCOME OF PREGNANCY

Statistics upon miscarriage and, particularly, abortion, are notoriously untrustworthy during normal times. Those from the Midwifery School in Rotterdam are included in Table V, but with no attempt at drawing conclusions from

them. They show, for whatever reason, an actual decrease in births of previable fetuses during the hunger period. This was followed by an increase after the Liberation. Numerous nonnutritional factors suggest themselves, among them the subsequently increasing birth rate which would cause the percentage of early termination of pregnancy to bulk large. The statistics were thus of no aid in establishing the relationship (if any) between maternal nutrition and spontaneous abortion. One can, however, record that an apparent increase in this unfavorable outcome of pregnancy did not appear during the time of undernutrition but did appear in women conceiving at or soon after that period.

TABLE V. INCIDENCE OF UNFAVORABLE TERMINATIONS OF PREGNANCY IN ROTTERDAM

CONDITION	PREWAR, (1938-1939) 674 BIRTHS	PREHUNGER (1943-1944) 659 BIRTHS	HUNGER (1944-1945) 412 BIRTHS	POSTHUNGER (Late 1945) 464 BIRTHS
		Per cent		
Abortion and miscarriage	1.67	5.6	2.2	3.7
Prematurity (under 2,250 Gm.)	5.27	4.98	6.3	5.15
Stillbirth	3.5	3.2	1.8	2.5
Neonatal death (in hospital, first 10 days)	1.55	3.0	2.36	3.0
Malformation*	1.36	1.6	0.5	1.35

*Malformation in 135 conceptions between Jan. 1 and April 1, 1945 (most severe undernutrition) 2.42%.

The subject of prematurity raises the difficult question of how it is to be identified. Recorded maternal statements too often showed impossible discrepancies in both directions between the supposed period of gestation and the weight of the infant. This was due in part to the amenorrhea and menstrual irregularities elsewhere described. It was obviously impossible to base the diagnosis of prematurity upon this sort of information. Use of body weight and length as determining factors becomes dubious when the weights and lengths of infants are depressed by the same agent whose effect upon premature delivery is under study. For lack of anything better, it was decided to consider as premature any infant weighing 5 pound (2,250 Gm.) or less. This is a sufficiently extreme criterion so that the number of infants in this weight range would certainly not be greatly increased by the effect of fetal malnutrition during full-term pregnancy.

On this basis, as shown in Table V, premature birth was slightly more common during the hunger period than during the previous winter or in the prewar figures. Comparing 659 "pre-hunger" with 412 "hunger" pregnancies, a statistically dubious increase from 4.98 to 6.3 per cent was observed. The figure for the post-hunger months of 1945 may be somewhat elevated because of the rapid rise in the birth rate which began in January and February, 1946. The premature fore-runners of that period made up an unduly large percentage among the extraordinarily few full-term births occurring in December. Indeed, it is also possible that in a reverse manner, the declining birth rate of June and July, 1945 (Table IV) tended to reduce the percentage of small premature infants born toward the end of the hunger period in April and early May. This phenomenon deserves attention as an illustration of the way in which errors

may creep into an apparently simple statistical analysis. In any case, the maternal dietary reduction which occurred in Rotterdam was not associated with any striking tendency to premature delivery. As prematurity was not an officially reportable condition, this could not be verified for the city as a whole. However, inquiry in other hospitals in The Hague and Amsterdam did not contradict the impression gained from these figures.

Inspection of Table V shows the surprising fact that the percentage of infants born dead after the fifth month of gestation (stillbirth) was reduced during the hunger months. This observation was subjected to verification by the official mortality statistics furnished by municipal authorities in Rotterdam and other representative cities and by the National Bureau at The Hague, and was definitely substantiated. Since stillbirth tends to be reported with some accuracy (as compared with the unsatisfactory information concerning abortion), the data are presumably reliable.

Neonatal death also showed no increase in frequency during the hunger period. These hospital data are much less satisfactory than those for stillbirth in that they cannot be substantiated by comparison with official municipal or national statistics. The latter do show a high level of neonatal deaths during the hunger period, but all sources also indicate that every environmental circumstance militated against the survival of infants born at home during the months of undernutrition. Hence, except for infants born in hospitals, it is impossible to regard survival through the neonatal period as any reliable test of infant vitality during the hunger-winter.

CONGENITAL MALFORMATIONS

Warkany and his colleagues reason from experimental animals that the period during which maternal malnutrition might result in fetal maldevelopment is probably over by the first six or eight weeks after conception in the human.[8] Moreover, it appears likely by the same inference that improvement in human nutrition within four weeks after conception would probably allow the fetal organogenesis to proceed normally. This therefore necessitated investigation of infants conceived after hunger had become severe (about January 1, 1945) but not later than four to six weeks before liberation, or the first of April. The critical births were thus those occurring at term during October, November, and December, 1945. As Table IV indicates, this period offered very little material for study. There appears, as shown in the bottom line of Table V, to have been a slight increase in malformations in these post-hunger births, but in view of the numerical discrepancy between the groups contrasted and the small percentages dealth with, it is not statistically significant. Indeed it has been calculated that had it been possible to examine every baby conceived during the worst nutrition period in the two cities of Rotterdam and The Hague, the number of cases accumulated would have been insufficient to prove anything, because of the low range in which these percentages lie.

Personal examination of infants was, in fact, attempted before this statistical dilemma became apparent. A great deal of time was spent in examining every infant of appropriate age brought to the so-called Consultatie Bureaux,

or Baby Clinics, of those urban areas where local authorities considered maternal undernutrition to have been most severe. While the infants were being examined, Miss D. Ten Haaf, a trained Dutch dietitian, took nutrition histories from the mothers in sufficient detail so that they might be graded with regard to consumption of vitamin A and riboflavin, the two elements of critical importance to proper fetal development in animals. Notwithstanding the extraordinary industry and assistance rendered by the clinic nurses (who are collectively thanked) only 224 infants of proper age could be furnished, again because of the temporarily low birth rate. Frank malformations were encountered in only seven infants, or 3.1 per cent, but these seven were not concentrated among the offspring of those women whose diets had been lowest in the vitamins mentioned above.

LACTATION

The impressions of Dutch pediatricians and obstetricians regarding the effect of maternal undernutrition upon lactation were somewhat inconclusive. Most felt that slightly less milk had been secreted by the average mother, but that the duration of breast feeding was not greatly affected. It was impossible to secure mathematical data upon the former point in the limited amount of time available for making these investigations. Moreover, numerous non-nutritional conditions inimical to the weight gain of infants, as well as the irregular use of occasionally available substitutes all tended to make infant weight gain an uncertain measure of quantitative lactation. Therefore, clinic records were studied to determine simply the duration over which the lactation process was maintained.

The results are shown graphically in Fig. IV. Here it will be observed that in fair and poor socioeconomic surroundings about the same percentage of mothers were nursing infants of three and six months during the early and late hunger periods as before and after. A very poor district of The Hague, where nutritional conditions were extreme and deaths from starvation common, furnished the last two lines of Fig. IV. Here slightly fewer infants of three to six months were being completely breast fed during the hunger-winter than before. On the other hand, the number of mothers supplying at least some milk to their infants was greater during the time of hunger.

Analyses made by Dr. J. H. P. Jonxis in Rotterdam[21] indicated that the milk produced by a few undernourished women showed no significant deviation from normal chemical structure. It is obvious that milk must often have been produced at the expense of the mother's own tissues, but no records by which the degree of such deficits could be measured were obtainable.

GENERAL COMMENT AND SUMMARY

The generalized undernutrition which occurred in Northwestern Holland during the winter of 1944-1945 was severe enough to interfere with the prenatal growth of infants born during that period. This was clearly shown for fetal weight, less definitely (but significantly) with regard to fetal length. Inasmuch as weight is a function of three dimensional growth while length is

but one dimension, this is not surprising. It is of interest that in the recent studies of Wallace[22] upon maternal undernutrition during late pregnancy in the sheep, the weights of newborn lambs were reduced by almost 50 per cent, while the lengths were much less sharply decreased. The decline of fetal growth, with its return to (and even beyond) previous normal levels after restoration of maternal food supply, indicate that the fetus is not independent of maternal diet. These findings testify to the actuality of the inadequate nutrition of pregnant women during the Dutch hunger-winter.

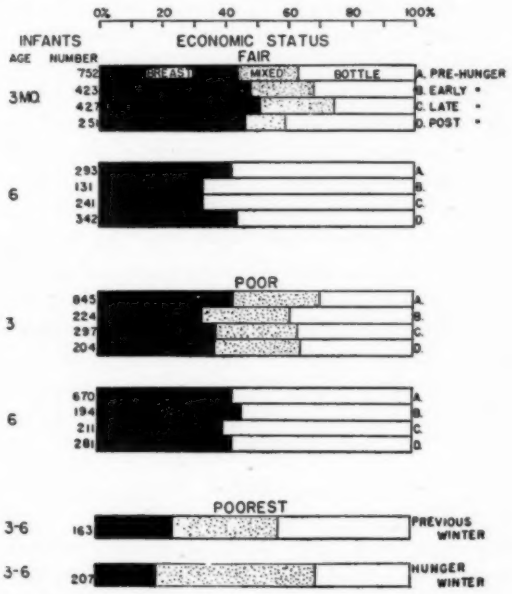

Fig. 4.—Percentages of clinic infants being breast fed at various periods before, during, and after the hunger-winter, according to economic status.

Under these circumstances menstruation ceased in about 50 per cent of urban women and became highly irregular in almost 50 per cent of the others. This is also presumable testimony to the degree of nutritional crisis. A result was the sharp decline in the number of births at appropriate later months.

Other effects must be presented with regard to their statistical reliability. For conclusions as to abortion and miscarriage, the available data were quite useless. The slight but statistically insignificant increase in premature birth appears to be founded upon serviceable figures. The frequency of stillbirth was definitely not increased. Data of dubious validity indicated that neonatal mortality was not increased. Congenital malformations, which appear irregularly in normal times, and are attributable to other factors not explored, were so slightly increased among the few conceptions occurring at the worst stage of undernutrition that the results in this regard are inconclusive. In any situa-

tion of sudden severe undernutrition similar to that which occurred in Holland, the almost predictable intervention of amenorrhea would, in fact, make the collection of useful statistics regarding fetal anomalies almost impossible. Lactation, considered solely as milk production sufficient to feed a baby, was evaluated well enough to indicate that the secretion of milk (in these limited terms) was not significantly influenced.

Perhaps the most important conclusion from consideration of the entire study is that nutrition, good or bad, is the sum of highly variable quantitative and chronologic factors. Total maternal undernutrition may well produce fetal effects entirely different from those of specific malnutrition associated with adequate intake of total calories. The results of any form of dietary inadequacy must vary in accordance with its extent in time, with the period of gestation in which it occurs, and especially with the duration of inadequacy before pregnancy. Only the most critical attitude toward all such matters and toward the social, economic, and genetic factors which may accompany improper food habits will clarify this very important subject. At present we still lack sufficient knowledge to say that deviations from the best possible maternal diet will inevitably lead to unsatisfactory results of pregnancy. Nor do we know to what degree proper maternal diet may be efficacious in producing uncomplicated pregnancies or more healthy infants at birth. The occurrences in Holland, however, add support to the accumulating evidence from animal experiments and human nutrition studies, that fetal growth may be retarded by lack of proper maternal diet.

CONCLUSIONS

During the six or seven months which preceded the liberation of northwestern Holland in May, 1945, a state of severe generalized undernutrition was prevalent in urban areas. The effects of this nutritional crisis upon the infant at birth were investigated especially in the cities of Rotterdam and The Hague. During the period, and apparently because of the low food supply, about 50 per cent of urban women became amenorrheic and presumably infertile. The birth weights of infants decreased, and rose after restoration of food, in a manner indicating that fetal weight gain is particularly related to the maternal diet of the last half or last trimester of pregnancy. Significant decline in birth length also occurred, but was less clearly apparent than the change in weight.

No conclusions could be drawn with regard to the frequency of abortion, while that of prematurity was insignificantly increased. Stillbirth was definitely not increased, nor was neonatal mortality among infants born in hospitals. The sharp fall in conception rate associated with amenorrhea resulted in so few pregnancies that data were inconclusive as to the relation between undernutrition in early pregnancy and malformation of the fetus. A slight but statistically insignificant increase in malformations did occur.

The percentage of mothers feeding their infants from the breast was not significantly altered during the hunger period.

Several of these results are so widely at variance with those of other studies as to indicate that great caution must be used in evaluating the maternal-fetal aspects of nutrition. Data as to the duration of maternal nutritional depletion and the specific dietary elements involved would appear to be of essential importance in any study of this problem.

Among the many persons in Holland who helped to make this investigation possible, thanks are especially due to Dr. A. van Ormondt of Amsterdam, Dr. J. H. P. Jonxis of Rotterdam, Professors E. Gorter and A. Holmer of Leiden, S. van Creveld and B. C. P. Jansen of Amsterdam, and K. de Snoo of Utrecht. Dr. C. Banning, Dr. Dols, and Dr. C. den Hartog of The Hague furnished many useful official statistics. Dr. J. Th. van der Hoeven was instrumental in locating infants for examination, and Miss D. Ten Haaf, the President of the Dutch Dietetic Association took the nutrition histories from their mothers, as well as performing many other useful services. Dr. J. Rietdijk, Miss Rijkenberg, and Dr. R. F. van Wering placed the records and facilities of the Midwifery School in Rotterdam completely at our disposal, as did the administrators of the Zuidwal Hospital at The Hague. Records were painstakingly transcribed by Miss Dini Kersteman, Miss M. Brandenberg, Drs. H. C. Rietdijk, and H. F. Begemann.

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INFANTILE MORTALITY IN BUDAPEST IN THE YEAR 1945

As Reflected by the Material of the Children's Clinic of the University

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THE war is over, but the consequences of its privations are still to be felt keenly. Infantile mortality in Budapest in the past year reached really tragic dimensions. The data on mortality of the Children's Clinic of the University of Budapest reflect the extent of this national catastrophe. Last year, out of the 1,053 infants under one year of age admitted, 485 (46 per cent) died. Before giving a detailed account of this strikingly high death rate, it should be mentioned that during the whole year there was such a rush of patients in critical condition to the hospital that we had to admit quite a number of cases who died within the first twenty-four hours after admission. Owing to the high number of admissions, 1,053 in 1945, in comparison with 527 in 1942, we also had to disregard a good many hygienic considerations because of the overcrowding of the partially destroyed hospital.

Fig. 1 shows the role of the more frequent diseases in this strikingly high mortality rate. The data are compared with data from 1942, which might still be considered a peacetime year. The differences between the data of the two years might be considered to be the results of war privations. The less frequent diseases, congenital malformations, prematures, and, in general, diseases that bear no relation on the subject under discussion, have been omitted.

The height of each blackened column illustrates the per cent of the total number of infants admitted who died from the disease specified at the base of the column. This percentage can be compared to the data for 1942 (height of the unblackened columns).

The comparison of black and white columns shows immediately that the principal causes of the high mortality rate in 1945 are diarrhea and malnutrition. In 1945, we lost roughly ten times as many infants with diarrhea and five times as many with malnutrition as in earlier years. The cases booked under "diarrhea" were at the same time more or less severely malnourished, but the leading symptom was diarrhea. Clinically, the vast majority of the diarrheal cases could be considered cases of dysenteric infections; unfortunately, no bacteriologic analysis of the stools was possible in view of our wrecked laboratory. It is known, however, from experiences in earlier years, that the dysentery and especially pseudodysentery bacilli could be identified from the stools of similar diarrheal epidemics in about 90 per cent of all cases.

The only bright feature in the tragedy we are describing is the fact that in spite of the universal shortage of fuel material, respiratory infections did not appear in higher numbers than in previous years. The death rate in pneumonia, empyema, and otitis was even lower in 1945 than in 1942. The capital

with its thousands of undernourished children was fortunately spared from a great outbreak of epidemic respiratory infections. Such an outbreak would perhaps have practically wiped out all the infants spared or convalescent from dysentery.

Cases with "toxic" symptoms were, due to the higher frequency of diarrhea, comprehensively more numerous in 1945 than in earlier years.

Infections with pyogenic germs, such as septicemias increased in numbers as a corollary to malnutrition and bad sanitary conditions in general, such as lack of soap and linen.

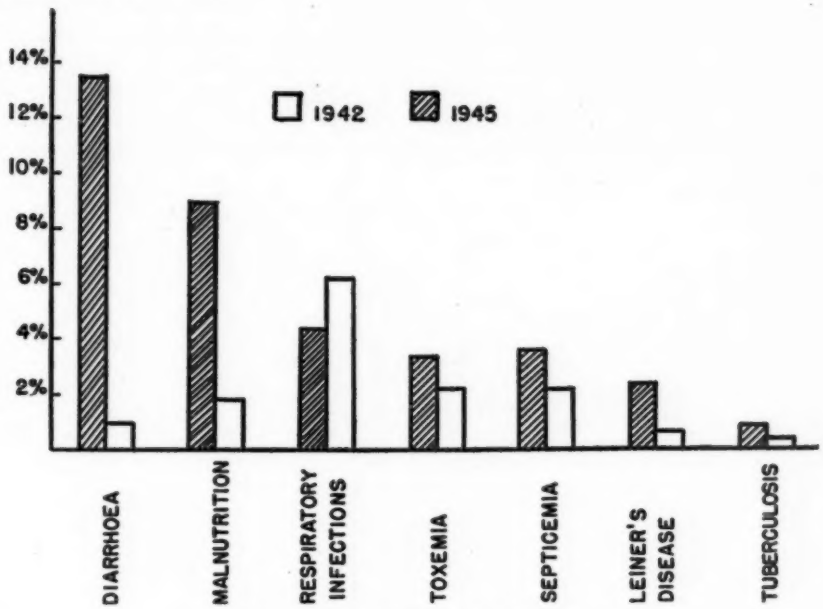

Fig. 1.—Mortality of certain diseases.

Quite an unexpected feature is the enormous frequency of cases of erythrodermia desquamativa of Leiner. We admitted four to six patients with this striking clinical picture every year, but the number of such admissions rose suddenly in 1945 to forty-five. We lost twenty-three of these. The increase in such cases might be connected with an unsatisfactory care of the skin (lack of oil, ointments, linen and soap). An infectious or deficiency factor could also, up to now, not be excluded from the etiology of Leiner's dermatitis.

The well-known postwar spreading of tuberculosis has not yet appeared to a great extent in our post-mortem material; we fear however, that the coming years will be worse.

Summing up the data described in Fig. 1, it is evident that the catastrophic increase in infantile mortality is to be attributed to diseases appearing regularly

every year in the capital. These well-known diseases, however, were more widely spread and caused a greater mortality in 1945 than ever before. The low resistance to these diseases is doubtless a result of the deficient nutrition of the infants. On the following pages will be described the extent and the causes of malnutrition.

The average weight at admission of the 1,053 infants analyzed in this paper was 26 per cent below normal (versus 10 per cent in 1942). This data is in itself indicative of the extent of malnutrition of the Budapest infants in 1945. As these infants had been fed almost exclusively, as will be described later, on a low protein, high carbohydrate diet ("Mehrnährschaden" of Czerny), the real extent of wasting was in many cases, due to starvation edema, unrevealed by the first weighing. As a sign of the loss of edema, the weight curve declined sharply after the first one or two weeks of adequate hospital diet and treatment with transfusions in a great number of cases. The real extent of malnutrition was accordingly greater than the average admission weight would indicate.

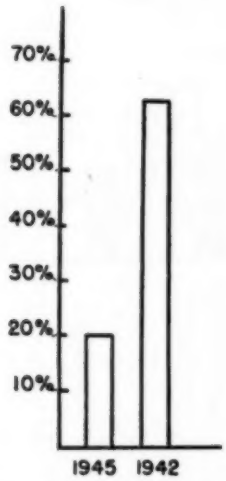

Fig. 2.—Percentage of infants breast fed on admission, 1924-1945.

Hand in hand with the malnutrition, rickets became almost universal. The deficiency of vitamin A was less marked, and cases with corneal ulcers were not observed. It is also interesting to point out that cases with manifest scurvy, a condition almost never observed in Hungary, did not appear in our material.

As to the origin of this unheard-of massing of malnutrition cases in Budapest, I will mention only a few facts. It is well known that cow's milk disappeared almost entirely from Budapest by the end of November, 1944, due to the approach of the battle front and the ruthless evacuation of cattle and food reserves by the defenders of the capital. The first scanty milk supplies appeared only a month after the siege, about the middle of March, 1945. By this time

every infant could receive 200 Gm. of milk. As the quality of this milk was, in spite of all efforts, strikingly bad, many mothers preferred to continue to feed their infants on milkfree diets. As powdered or evaporated milk were practically nonexistent, the formula generally used in the town consisted of a mixture of colloidal and crystalloid carbohydrates boiled in water with an occasional addition of traces of melted butter. In some exceptional cases, small additions of casein preparation were available. Beside this carbohydrate regime, older infants got some dried peas, potatoes, and exceptionally, carrots. Fruits did not come to the capital for almost half a year, and cod-liver oil, and vitamins were extremely scarce.

The situation briefly outlined above was greatly aggravated by the unlucky coincidence that the number of breast-fed infants declined sharply with the approach of the horrors of the siege. The milk production of the physically and morally exhausted, badly nourished mothers declined or even disappeared; the number of artificially, and comprehensively, inadequately fed infants increased steadily. Fig. 2 shows the extent of this misfortune as reflected on our admission material of 1945 compared to that of 1942.

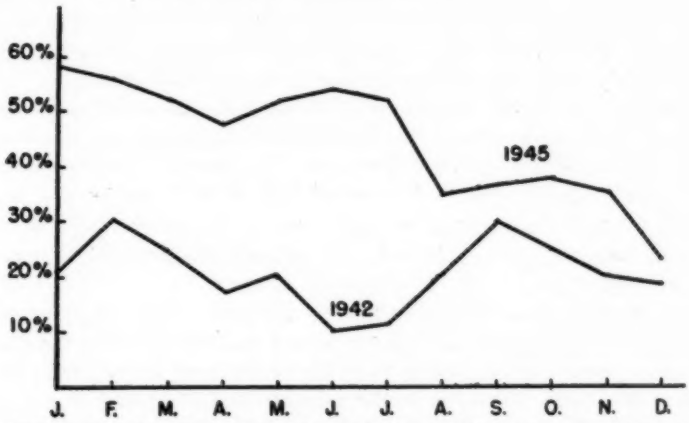

Fig. 3.—Mortality rate per month for 1942 and 1945 (calculated in percentage of monthly admissions).

The height of the white column shows the percentage of infants who had been breast-fed at admission and who could obtain women's milk in the clinic. (The figure is compiled only of data from the first seven months of 1945: later, conditions improved.)

I feel, that this decrease in the percentage of breast feeding, combined with the limited possibilities of artificial feeding, violating all the basic laws of pediatrics, explains the massed malnutrition in Budapest.

As to the origin of massed diarrheal disease, this had also been expected but could not be averted by our pediatricians under the given conditions. Dysentery is, as mentioned before, to a certain degree endemic in Budapest.

The great extent of the epidemic of 1945 seems to be explained by the following circumstances: cow's milk used for infant feeding should be, according to universally accepted, reasonable, pediatric standards, fresh, clean, unchanged, and free from preservatives. It should be free from pathogenic bacteria, and it should be used within twenty-four to forty-eight hours after milking. The disintegration of our milk collecting system, the breaking down of the communication system, the lack of ice, and the invasion of flies breeding in billions in the mountains of garbage and wreckage blocking the streets made it impossible to fulfill any of the postulates described before.

The increased mortality rate in Budapest is, as was demonstrated, a phenomenon that had to occur because of the unavoidable violation of well-known and well-established pediatric laws. As was mentioned before, conditions were such that the foreseen catastrophe could not be averted. We want to show, however, that help is possible, even with badly undernourished material, if optimal conditions can be realized. That was partially possible, if not for the community as a whole, at least for the Children's Clinic.

On the basis of prewar literature (Quest, Nobécourt) it is generally felt, that in cases of malnutrition, if the degree of wasting reaches 35 to 40 per cent of the average body weight, recovery is impossible. We found, however, in the latter half of 1945, having at this time an almost satisfactory supply of vitamins, drugs, women's milk and powdered milk at our disposal, that with the means mentioned above and with the help of blood and plasma transfusions continued daily for 10 to 20 days, quite a few cases reduced to 50 per cent, and some to 40 per cent of their ideal weight, could recover. The results of improved conditions and therapeutic possibilities in the second half of 1945 can be seen in Fig. 3.

In this figure the monthly mortality rate of the years 1945 and 1942 are plotted against each other. The data are calculated in per cent of the monthly number of admissions.

It can be seen from the figure that the mortality of the year 1945 begins to decline in the late summer and reaches almost the 1942 level by the end of the year. The average infant mortality of the clinic, even under peacetime conditions, is rather high. It varies in the neighborhood of around 20 per cent, the policy of the hospital being to admit only cases in a serious condition.

This reduction in mortality has been achieved, as was told before, by increased therapeutic facilities in the clinic, coming from various sources. By the end of July, the director of the Children's Clinic, Professor Paul de Kiss, obtained from the department of social welfare of the city of Budapest, food supplies to be exchanged for surplus milk of volunteering nursing mothers. This "milk bank" turned out to be a complete success; by the end of August every infant who needed it could get women's milk. At about the same time the International Red Cross put powdered milk at the disposal of the clinic in sufficient quantity to make artificial feeding safe and satisfactory. The chaotic financial status of the clinic was also somewhat relieved by gifts from the International Red Cross; damaged rooms could be repaired, remedying overcrowding. The same financial aid made it possible to give blood and plasma

transfusions on a larger scale than ever before. It should be mentioned here how hard it is to get volunteers for a series of ten to twenty blood transfusions in a half-starved community, if an adequate amount of food cannot be given to the volunteer. This point was, in our case, important, because a large part of the infants under our care had neither parents nor relatives. The medicine supply of the clinic also improved slowly in the second half of 1945. Help came from the International, the Swedish, and Danish Red Cross. Last but not least, the doctors of the American Military Mission, Colonels Shackleford and McClain, acquainted us with and taught us the use of penicillin.

By the end of 1945, we used penicillin in over twenty desperate cases, with unexpected results. This number has been increased now to over 140 cases.

Summing up the bitter facts presented in this paper, it is evident that the lowering of infantile mortality for the country as a whole is primarily not so much a medical as a social and financial problem. The availability of reliable or, if possible, condensed or dried milk in satisfactory amounts for the total population, together with a more ample supply of vitamins, soaps, oils, and linen, and the battle against flies, are the basis for a general campaign to lower infantile mortality. It is comprehensible that this goal cannot be attained fully without the restoration of our Children's hospitals to prewar efficiency.

CHILDREN BORN DURING THE SIEGE OF LENINGRAD IN 1942

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THE extreme hardships endured by the people of Leningrad during the siege of that city by the Germans from 1941 to 1943 were bound to affect the health of the women, the course of their pregnancy and confinement, and the condition of their newborn children.

The material presented here is based on records of the Department for the Newborn of the Leningrad State Pediatric Institute. It deals primarily with children born during the siege in 1942. (The Siege of Leningrad lasted altogether from August, 1941, to January, 1943. Conditions were especially severe from the city's encirclement in September, 1941, until pressure was eased somewhat in February, 1942.) Though this material is incomplete and has many defects, it is felt that its publication is justified. Though it fails to answer many questions, factual material obtained under exceptional conditions is useful for comparison and in this instance has some historic value. As to its incompleteness, the material was collected by people who lived under great difficulties, and should not be judged too strictly.

Incessant bombing from the air, shelling from long-range guns, fires, air-raid alarms by day and night all had their effect on the nervous systems of the women. Without stopping daily work for a minute, the whole population took part in improving the city's defenses. Houses were without heat, and the winter of 1941-1942 was unusually severe. There was no transportation. On a diet hardly sufficient to keep them alive, the women had to undergo physical exertions to which many of them had not been accustomed, such as standing in long lines for bread and other things in the biting cold and often at night, walking long distances, sometimes with heavy loads, chopping wood, clearing snow and ice, cleaning back yards, and standing guard during the long cold nights at entrances to buildings or on roofs in the frequent air raids.

The people suffered from hunger because food was insufficient in quantity and inferior in quality. The mortality rate was high. Cases of alimentary dystrophy increased greatly. Food conditions during this part of the siege can be judged from the rations of bread, at that time the principal food. The daily allowance of bread from September, 1941, to February, 1942, was as follows:

During month of—	Ration for manual workers (Gm.)	Ration for mental workers (Gm.)
September, 1941	500	300
October, 1941	400	200
November, 1941	300	150
December, 1941	250-350	125-200
January, 1942	400	300
February, 1942	500	400

Translated from the Russian.

Not only were the rations small, but the nutritional value of the bread was low, for it consisted of about one-half defective rye flour, the rest being substitutes such as cellulose, malt, and bran.

Thus, hunger, vitamin deficiency, cold, excessive physical strain, lack of rest, and constant nervous tension had their effect on the health of the women, the intrauterine development of the fetuses, and the condition of the newborn children during the siege.

General Information on Children Born in 1942.—General information on babies born in 1942 is given in Table I. In the first six months, 414 women entered the clinic; in the second half of the year, only seventy-nine, owing to the sharp fall in the birth rate in Leningrad. Aside from the numerical difference, the mere fact that a number of women became pregnant and bore children at a time when amenorrhea was widely prevalent suggests analysis of the figures for the second half of 1942 separately from those for the first half.

TABLE I. BIRTHS AND NEONATAL DEATHS FOR THE YEAR 1942

	NUMBER DURING PERIOD		
	JANUARY TO JUNE	JULY TO DECEMBER	YEAR 1942
Births			
Live births:			
Born at term	230	72	302
Born prematurely	161 (41.2%*)	5 (6.5%*)	166 (35.5%*)
Total live births	391	77	468
Stillbirths	23 (5.6%†)	2 (2.5†)	25 (5.1%†)
Total, all births	414	79	493
Neonatal deaths			
Of babies born at term	21 (9%‡)	1 (1.4%‡)	22 (7.3%‡)
Of babies born prematurely	62 (30.8%§)	3 (60%§)	65 (39%§)
Total neonatal deaths	83 (21.2%*)	4 (5.2%*)	87 (18.6*)
Total loss in children (stillbirths plus neonatal deaths).	106 (25.6%†)	6 (7%†)	112 (22.7%†)

*Per cent of live births for same period.
†Per cent of all births for same period.
‡Per cent of live births at term for same period.
§Per cent of premature live births for same period.

TABLE II. LIVE BIRTHS AND STILLBIRTHS, 1939 TO 1942

	NUMBER						RATIO OF STILLBIRTHS TO ALL BIRTHS FOR SAME PERIOD (%)		
	LIVE BIRTHS			STILLBIRTHS					
YEAR	JANUARY TO JUNE	JULY TO DECEMBER	ENTIRE YEAR	JANUARY TO JUNE	JULY TO DECEMBER	ENTIRE YEAR	JANUARY TO JUNE	JULY TO DECEMBER	ENTIRE YEAR
1939	2,014	1,958	3,972	51	52	103	2.50	2.66	2.52
1940	2,685	1,639	4,274	72	40	112	2.73	2.44	2.55
1941	2,007	1,049	3,056	49	34	83	2.44	3.24	2.64
1942	391	77	468	23	2	25	5.55	2.53	5.07

Premature births in the first half of 1942 reached the high proportion of 41.2 per cent; in the second half the proportion was only 6.5 per cent, which differs little from the normal rate. The proportion of stillbirths also was exceptionally high in the first half of the year (5.6 per cent) while in the second half it was 2.5 per cent, which is within normal limits as can be seen in Table II.

How did the seventy-nine women who entered the clinic in the second half of 1942 differ from the other women in Leningrad, so that they did not suffer from amenorrhea and were able to become pregnant, and so that the proportions of stillbirths and of premature births among them were not above the normal? While the material is too limited for positive answer, there are reasons to believe that their nutrition was much better than that of the rest of the women in the city during that period. It was possible to ascertain that among these seventy-nine women, fourteen were employed in food industries (cooks, waitresses, and others), six were receiving military rations, seventeen were physicians, nurses, teachers, and members of other professions, fourteen were manual workers, and twenty-two were housewives. Had information been obtained about the occupations of the husbands of the twenty-two housewives, it would doubtless have strengthened further the assumption that the food of the women who bore children in the second half of 1942 was considerably better than that of the other women in the city. In any event, these seventy-nine women did not suffer from the hunger that was the lot of the others.

On the other hand, it seems obvious that the cause of the unusually high proportions of premature births and of stillbirths in the first half of 1942 was hunger during pregnancy, that is, the insufficient quantity and the unsatisfactory quality (lack of vitamins) of the women's food.

Average Birth Weight of Children Born in 1942.—In dividing the newborn children into those born at term and those born prematurely, one should not be guided by one symptom but should consider, for each child, the obstetric history together with the baby's length and weight and the general morphologic data. But since the obstetric history is not always available nor always reliable, and since the weight of the newborn can hardly be taken as an indicator of his maturity or prematurity when the mother suffered from hunger during her pregnancy, we have preferred to take the length of the newborn as a more stable and sufficiently objective sign. Accordingly, we have placed in the category of children born at term those whose lengths at birth were 47 cm. or more, irrespective of weight, and we have classed as premature those less than 47 cm. long at birth.

In considering the children according to weight at birth, we found that they grouped as follows:

Weight at birth:	*Number*	*Per cent*
Less than 2,000 Gm.	77	20.9
From 2,000 to 2,500 Gm.	104	28.2
From 2,500 to 3,000 Gm.	118	32.1
From 3,000 to 3,500 Gm.	56	15.2
From 3,500 to 4,000 Gm.	12	3.3
Over 4,000 Gm.	1	.3
Total	368	100.0

The number of children with low birth weights was striking. Of those born in the first half of 1942, 49.1 per cent weighed less than 2,500 Gm., and only 4 per cent weighed more than 3,500 Gm. As can be seen from Table III, even

TABLE III. AVERAGE WEIGHT AT BIRTH OF INFANTS BORN AT TERM

PERIOD	AVERAGE WEIGHT AT BIRTH (GM.)		NUMBER INCLUDED IN COMPUTATION OF AVERAGE	
	BOYS	GIRLS	BOYS	GIRLS
January-June, 1941	3,444	3,302	933	874
July-December, 1941	3,344	3,222	503	447
January-June, 1942	2,815	2,760	135	120
July-December, 1942	3,199	2,890	39	32

in the latter half of 1941 it was possible to observe a slight decrease, about 100 Gm., in the average birth weight. That decrease is attributed to the deterioration of the diet and general living conditions in the beginning of the siege, when the pregnancies of the women who bore children in the second half of 1941 were near an end. The fall in the average birth weight was much greater in the first half of 1942, that is, among the children of women who suffered from hunger during all or nearly all of their periods of pregnancy.

The average birth weight of boys carried to term in the first half of 1942 was 529 Gm. less than in the last half of 1941, and of girls it was 542 Gm. less. Though our material is not extensive, there is no doubt about the reliability of these figures, inasmuch as an almost equal decrease in average birth weight of children carried to term was observed in other maternity clinics in Leningrad. In the Snegirev clinic, the average decrease was 500 Gm.[1] In the obstetric-gynecologic clinic of the Second Leningrad Medical Institute the average birth weight in 1942 was 410 Gm. less than in 1940.[2]

From Table III it can be seen that the average birth weight increased considerably in the second half of 1942, though it was still noticeably below normal. This increase apparently should be attributed not so much to improvement in food conditions of the Leningrad population as a whole (although no doubt there was some general improvement) as to the fact already brought out that a large proportion of the women who bore children in the second half of 1942 were receiving considerably better food than the other women in Leningrad.

Physiologic Loss of Weight in Children Born at Term.—In 1918, on the basis of many observations of the effect of hunger on lactation in women, we came to the following conclusions:[3] (1) in spite of hunger, the mammary gland secretes milk if there is sufficient physiologic stimulation, that is, the capacity for breast feeding remains; (2) the quantity of milk, however, decreases; and (3) the duration of the lactation period becomes shorter. These circumstances were observed also during the siege of Leningrad, 1941 to 1943, with the difference that the mother's incapacity to produce sufficient milk was greater.

The extent and duration of the physiologic loss of weight and the rapidity of restoration to the initial weight depend mainly upon food conditions, that is, on the quantity of the mother's milk; to some extent they probably depend also upon the strength with which the child sucks, that is, on his general vigor. Most of the children born late in 1941 and in the first half of 1942 of severely exhausted mothers had very low vitality. The mothers as a rule had very little milk, and many babies had to be fed, even in the first few days of their lives, on artificial mixtures prepared from milk substitutes because there was no cow's milk.

Data on the physiologic loss of weight in children born at term (with a length of 47 cm. or more) in 1942 are given in Table IV, except for those who died while still at the clinic and for those whose mothers returned to their homes on or before the fourth day after the birth.

TABLE IV. PHYSIOLOGIC LOSS OF WEIGHT IN NEWBORN CHILDREN DURING 1942

AGE	NUMBER	WEIGHT (GM.)	LOSS OF WEIGHT, (GM.)
At birth	212	2,808	--
Second day	177	2,723	-85
Third day	199	2,643	-80
Fourth day	188	2,599	-44
Fifth day	161	2,590	- 9
Sixth day	125	2,535	-55
Seventh day	104	2,577	+42

The loss of weight lasted three days or less in only 11.2 per cent of the children; in 88.8 per cent it lasted more than three days. Many of the children were discharged without any established tendency toward further gain in weight. On the average, the loss of weight continued for six days instead of three to four days; the average loss was 273 Gm., 9.7 per cent of the original weight.

Clinical Characteristics.—The most noticeable characteristic of the newborn children in the first half of 1942 was their low vitality. Most of them were inert from time of birth; they did not maintain their temperature satisfactorily and became chilled easily; their sucking at the breast was weak; they had little resistance to all outside harmful influences. This general functional insufficiency was favorable to the development of various diseases that ended fatally after brief courses. In some newborn children it was possible to see a highly colored physiologic erythema, which in most cases remained very long (four to seven and even eleven to fifteen days). On the other hand, cases of so-called toxic erythema of the newborn were observed rarely. According to Vogt, this is generally found in almost 50 per cent of the newborn. We too had observed this condition very often in normal times, though we never attempted to determine its frequency.

In the first six months of 1942 we observed erythema in six of the 391 newborn children, about 1.5 per cent. In the second half of that year, there were eleven cases among the seventy-seven infants, or fourteen per cent. If toxic erythema is to be considered an allergic condition, its disappearance evidently should be attributed to the absence, from the food of the hungering mother, of some substances (possibly albumins) that produce sensitization in the child's body and bring about this rash.

Swelling of the mammary glands, usually found in 95 per cent of the newborn and very pronounced in 1.5 per cent, was observed in the first half of 1942 in only nine of the 391 newborn children, or 2.3 per cent. On the other hand, we observed quite often a congenital softening of the bones of the skull, open sutures, and very wide fontanels, which in former times were rare.

Our data about the greater frequency of stillbirths and premature births, the low birth weights, the lowered vitality of the newborn children, and the

changes in their bones, agree closely with data obtained in experiments on animals subjected to severe hunger. Therefore, although we are unable to determine the exact difference between the food ration of our hungering mothers and a normal diet, it is possible to conclude on the basis of the courses of their pregnancies and the condition of their newborn children that they had been subjected to severe hunger both quantitative and qualitative.

Morbidity and Mortality.—The morbidity of children born in 1942 was very high, 32.3 per cent. In the first half of the year it was 33.5 per cent; in the second half, 27.1 per cent. Scleredema and sclerema were most frequent, particularly in the first semester, with fifty-three cases; next was pneumonia, with fifty-one. There were ten cases of intracranial hemorrhage. Most of the cases of scleredema and pneumonia were fatal, particularly when the two were combined.

The mortality of children born in 1942, particularly in the first half of the year, was unusually high. Of the 391 children born alive in the first half, eighty-three (21.2 per cent) died in that period; twenty-one (9 per cent) of the 230 infants born at term and sixty-two (30.8 per cent) of the 161 premature infants died.

An equally high, or even higher, mortality of the newborn was observed in the other maternity homes of Leningrad. In the obstetric clinic of the First Medical Institute, the neonatal mortality in 1942 was 5.6 per cent for those born at term and 44.2 per cent for premature infants. For the city as a whole, the mortality of infants born at term was nowhere less than 12 per cent and in some institutions as high as 31.9 per cent. For the premature infants the range was from 50 per cent to 80 per cent.[2]

The main causes of death were: pneumonia in thirty-one cases; pneumonia combined with scleredema in seventeen; scleredema in ten; intracranial hemorrhages in nine; prematurity and congenital debility in eleven; other causes in four; unknown causes in five. It must be stated, however, that in the eighty-seven deaths the causes were determined by pathologic examination in only seven cases, because the autopsy room did not function during the entire winter of 1941-42 on account of lack of water, fuel, and for other reasons.

Regarding prematurity and congenital debility as causes of death, these diagnoses were found many times in reports of autopsies not only in 1942 but also in 1943, in spite of the fact that the Department of Pathology and Anatomy of the Institute tried hard to avoid such indefinite diagnoses. In many cases the pathologists and anatomists were unable to ascertain more accurately the cause of death. Clinically, these infants presented a very definite picture of general congenital debility.

The mortality rate from pneumonia and scleredema is attributed to the conditions under which the clinic was operating in the winter of 1941-1942.

Department for the Newborn During the Siege.—In the beginning of the war the Department for the Newborn consisted of 120 beds and was situated on the third floor of the obstetric-gynecologic building. During air raids the babies were taken by elevator to the basement, where an air-raid shelter was specially

equipped for them. Late in the fall of 1941, damage to the central heating plant forced the obstetric department to move, with reduced facilities, to other quarters which could be heated by stoves. The Department for the Newborn was placed in a ward of fifteen to twenty beds, which was heated by a brick stove with a pipe connected to a window. The stove was too small to heat the ward adequately; it smoked often, and there was not enough wood. The temperature in the ward was usually very low, often 50° F.; in the fourth week of January, 1942, it went down to 40° F. The physicians and nurses worked in their overcoats (over which they wore white coats) and in felt boots. Medical examination of the infants and changing of diapers brought danger of chilling. The same danger threatened in the corridor and in the mothers' ward, where the infants were taken for feeding and where the temperature was lower still. The situation was made worse by the insufficiency of heaters, the impossibility of repairing damaged heaters, and the insufficiency of hot water (the water system was not working; water could be heated only on the stoves in the wards). It is not surprising that during that time many newborn infants died from such diseases as scleredema, sclerema, and pneumonia. It should be added that of the children born at home the majority were brought to the clinic severely chilled.

The large number of premature births, the congenital debility of many babies born at term but with low weight, and poor conditions of care and feeding, all explain the high neonatal mortality at the end of 1941 and in 1942. Under these difficult conditions, the staff of the Department for the Newborn, Dr. R. M. Levis and the nurses, themselves in a condition of advanced alimentary dystrophy, did everything they could to preserve the lives of the newborn babies; but, unfortunately, many things did not depend upon their good will and devotion.

Weight of Newborn Children.—The effect of hunger of the pregnant woman on the weight of the newborn child was discussed at the end of the war of 1914-1918. Contradictory opinions were expressed. The majority of the writers concluded that the mother's insufficient food during the war had no noticeable effect on the weight of the newborn child, and that there were no "war babies" with a definitely lower birth weight (Richter, Kütting, Tschierch, Ruge, Bruce, Murray, and others).

Other authors, however, noted that insufficient food of pregnant mothers had brought about a slight decrease in the average weight of newborn babies. According to Hamm this decrease was 32 Gm.; Hecker, 50 Gm.; Schauta, 80 Gm.; Bickhoff, 100 Gm.; David 95, Gm. (3 per cent); Binz, 3 per cent; and Peller, 11 per cent. Peller and Bass expressed the opinion that in hungering mothers there was a compensatory lengthening of pregnancy and the decrease was therefore comparatively small. That opinion was rejected by David, according to whose data the duration of pregnancy, whether in wartime or peacetime, was, on the average, 273 days. Some writers, among them Brüning, found that in the war of 1914-1918 the proportion of newborn babies of normal weight and above normal not only failed to decrease but even showed some increase.

The contradictory results of these studies can be explained by the fact that living conditions and food are not the same in all localities of the same country; they are better in some places and worse in others.

Is it surprising that in England (Bruce and Murray) the war years did not affect noticeably the birth weight of babies? Can it be said that the people of England or Germany really suffered from *hunger* in the years 1914-1918? There was some deterioration of general living conditions and some food shortages among certain parts of the population, but there was no hunger. This circumstance explains why the majority of authors came to the conclusion that the diet of the pregnant woman had either no effect on the weight of the newborn baby or only a very slight effect.

Among the Russian writers the conclusions are less contradictory and more definite than those of the English and German writers. According to Shkarin,[4] the proportion of babies with birth weights above the average (more than 4,000 Gm.) was lower in 1919 than in 1913, while the proportion with very small birth weights (below 2,300 Gm.) was higher. Lurie and Belugin[5] found that with insufficient diet there was a slight decrease in birth weight, in 1919 the average birth weight was 160 Gm. less than in 1915. According to Troitzkaia,[6] the average birth weight in 1919 was 200 Gm. less than in 1914. This did not prevent either Troitzkaia or Lurie and Belugin from reaching the conclusion that the fetus receives from the mother's body everything it needs for its development, regardless of the nourishment received by the mother from the outside, that, in other words, the fetus behaves like a parasite.

According to Lichkus and Valitzki,[7] the average birth weight of children carried to term was 3,485 Gm. in 1911 and 3,269 Gm. in 1919, a decrease of nearly 200 Gm. or 5.7 per cent. Gershenson[8] found that the average birth weight of children of primiparas in Odessa in the famine years 1921-1922 was 112 to 113 Gm. below that in the prosperous years 1924-1926; for children of multiparas the difference was 210 to 258 Gm. Gershenson rejects the theory that the fetus is a parasite, and considers that the mother's exhaustion caused by insufficient food (possibly combined with serious emotional disturbances) results in a considerable lowering of the birth weight. Treiter[9] states that the average birth weight in Viatka in the famine year of 1920 was 3,107 Gm. or almost 100 Gm. lower than the average of 3,200 Gm. in 1913, a prosperous year.

Thus, the Russian writers, while differing somewhat in the evaluation of their factual material, came to the fairly unanimous conclusion that the insufficient diet of pregnant women results in a lowering of the average birth weight of their children. The data on the weight of newborn children given by foreign writers do not agree with those of Russian writers, but both coincide with the results of animal experimentation on the effects of the mother's hunger on the fetus.

On the basis of his experiments, Rudolski[10] thinks that a general decrease in the pregnant female's food not only may bring about insufficient general development of the fetus and low vitality, but also may affect some special tissue, as, for instance, that of the bones. "The young of hungering female

animals," he states, "differ greatly in their appearance from those of normal females, particularly in cases of medium and severe degrees of hunger; the young lack teeth, their integuments are transparent, their subcutaneous fat is poorly developed, and their bones are soft and flexible." A decrease in the size of some young and the above-stated changes in them were observed by Rudolski only when the hungering mothers' food ration was cut to one-fifth or less of its normal size. When the female rabbit's food ration was cut to one-half and the dog's ration to one-third the young were of normal size.

In conclusion, the results of our clinical observations agree with the results of experiments on the effect of hunger of pregnant animals on their young. If the hunger during pregnancy does not exceed certain limits, it does not noticeably affect the development of the fetus, which is able to extract from the mother's body whatever it needs for normal development. However, if the hunger has reached a severe stage, it invariably affects the development of the fetus by producing stillbirths, a large percentage of premature children, a sharp decrease in the average birth weight, and a large number of children born with low vitality.

SUMMARY

1. The severe quantitative and qualitative hunger from which the women of Leningrad suffered during the siege affected the courses and results of their pregnancies and the condition of their newborn children.

2. During the particularly severe hunger in the first half of 1942, the stillbirth rate rose to 5.6 per cent, twice the normal figure; the rate of premature births reached the unusually high figure of 41.2 per cent.

3. There was a great decrease in the proportion of children born at term with heavy weights, and conversely a considerable increase in the proportion of lightweight children.

4. The average weight of infants born at term in the first half of 1942 was 500 to 600 Gm. less than normal.

5. The physiologic loss of weight continued longer than usual; the average loss exceeded the usual figure.

6. Of the clinical characteristics of the newborn infants, the following were noteworthy:

a. Generally lowered vitality.
b. Brightly colored, physiologic erythema, which in some infants continued for a long time.
c. Rare occurrence of toxic erythema of the newborn.
d. Rare physiologic swelling of the mammary glands.
e. Frequent congenital softening of the skull bones.

7. The morbidity of the newborn was unusually high, 32.3 per cent, owing in part no doubt to their low vitality. The most frequent diseases were scleredema, sclerema, and pneumonia.

8. The mortality of the newborn was unusually high, 9 per cent for those born at term and 30.8 per cent for those born prematurely. This too should be attributed to a certain extent to the low vitality of many of the children.

9. The capacity for breast feeding remained even in severe degrees of hunger, but less milk was produced and the breast feeding period was considerably shorter.

10. While, in general, we do not contradict the prevailing opinion that the fetus behaves like a parasite in the mother's body, we can say on the basis of our material that the condition of the host, the mother's body, is of great consequence to the fetus, and that severe quantitative and qualitative hunger of the mother decidedly affects the development of the fetus and the vitality of the newborn child.

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AIRBLOCK IN THE NEWBORN INFANT

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THE condition produced by escape of air from the normal respiratory pathways into tissues in which it is not normally present may frequently become very serious. For this reason a previous author[1] believes that it deserves a name and has used the term airblock. To us this term seems accurate, descriptive, and adequate; we have, therefore, employed it.

Our earlier report on this condition in the newborn period[2] suggested to us that a more accurate appraisal might be possible after we had observed a series of patients who came to necropsy. The post-mortem examinations in the six cases herein reported were performed by four different pathologists. In order to obtain a thorough review of all cases we have asked the third author, a pathologist, to participate in this study.

Since some of the terms used are awkwardly long, we have substituted the abbreviation PIE for pulmonary interstitial emphysema, ME for mediastinal emphysema, and PT for pneumothorax. The use of such abbreviations in a discussion of airblock is not without precedent.[3]

METHODS OF POST-MORTEM EXAMINATION

It is our belief that airblock is frequently unappreciated at autopsy. Aberrant air may not be detected by the usual methods of examination, and its presence and importance are likely to be appreciated only if the pathologist has airblock in mind. Davis and Stevens[4] reported finding six patients with PT in routine roentgenographic examination of 702 consecutive newborn infants, an incidence of approximately one per cent. PT, then, might be expected to exist in one per cent of all newborn infants coming to necropsy, regardless of the cause of death. Since PT and ME are extensions of PIE, the last should be even more common. Moreover, airblock alone may prove fatal. This suggests that air outside of the normal respiratory pathways is present in considerably *more* than one per cent of all newborn infants coming to necropsy. When one considers the careful examination by the pathologist to detect other conditions which may be present in no more than one-tenth of one per cent of newborn infants, the belief that aberrant air frequently does not receive its due consideration seems justified.

The most reliable method of demonstrating PT at autopsy is to enter the pleural spaces under water. We believe that this should be a part of the routine post-mortem examination of newborn infants. It is our practice to enter the pleural spaces with the entire infant submerged in water, being careful not to damage the visceral pleura. The pericardial space should be entered

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similarly. Although ME is usually quite evident if present, it is advisable that the sternal plate be removed while the infant is still submerged. Before the thoracic viscera are disturbed, each lung should be gently lifted forward and the posterior mediastinum inspected for emphysema.

We have had no experience with Hartroft and Macklin's method of reinflating the lung with an intrabronchial fixative.[5] However, in cases other than those reported here, we have ligated the trachea before entering the thorax so as to avoid the loss of air occasioned by collapse of the fresh lungs. In the patients with more severe PIE there are likely to be subpleural blebs of air, varying in size up to more than one centimeter in diameter. These blebs of air are in the interstitial tissue; they are not dilated alveoli nor congenitally large air sacs. If these are not visible in the fresh state, they may appear if the entire, uncut lungs are subjected to fixation in 10 per cent formalin. We have discovered this in patients with PIE seen since the last one reported here. Similarly, PIE present deeper in the lung is more easily demonstrable if the entire lungs are fixed before they are cut. A very satisfactory manner of examining the cut surface of the fixed lung for PIE is to use a binocular dissecting microscope which provides a magnification that can be varied from about ×12 to ×36. In this way a view may be obtained of tissue masses too large to be satisfactorily sectioned and stained. Also, the tissues are thus examined before being subjected to the further distortion and shrinkage involved in the preparation of stained sections. It provides an important link between gross examination and microscopic examination of prepared sections, by means of which the latter may be more satisfactorily interpreted. Occasional findings, which may be possible artifacts or post-mortem changes, can sometimes be more accurately interpreted by the presence of hemorrhage resulting from PIE.

Although we thought occasional sections suggested the presence of air inside both blood vessels and dilated, torn lymph channels, these findings were not recorded in the autopsy protocols, since our patients were not examined for air embolism. It is probable that such an examination should be a routine part of the autopsy of these patients. Joannides and Tsoulos[6] found air in the cardiac chambers and general circulation in 80 per cent of dogs that developed experimentally produced PIE. Others[1, 7] have noted air in the vascular system following similar experiments.

Although in one of our patients the fresh lungs were reinflated with air below water in an effort to detect the escape of air either through the visceral pleura or at the mediastinum, we do not think that the reinflation was performed in a satisfactory manner. Therefore, this was omitted from the autopsy protocols. Such a procedure is valueless unless a manometer is used to ascertain the amount of pressure employed. It must also be borne in mind that the act of reinflation may itself produce PIE and impair the value of subsequent examination. However, demonstrating a break in the visceral pleura by purely anatomical means is very difficult and often unreliable. For this reason we attach little value to an apparent rupture of the pleura as evidenced by stained microscopic sections.

CASE REPORTS

CASE 1.—Infant S., a boy, was born Aug. 12, 1943, at 6:30 A.M., at Hermann Hospital, weighing 3,300 Gm. Delivery was spontaneous of a 28-year-old white woman, gravida 4, para 3. Position was left occipitoanterior. The first two stages of labor lasted about twelve hours. The mother received nitrous oxide and ether during delivery. The infant appeared weak and feeble, and respiration was established with difficulty using a tracheal catheter, carbon dioxide-oxygen inhalations, Metrazol, and artificial respiration (type not recorded). Physical examination showed pallor, cyanosis, and labored respiration. Both lungs were full of fine, sticky râles. Cry was absent. The infant was given continuous inhalations of 5 per cent carbon dioxide and 95 per cent oxygen.

During the day respiration continued shallow and labored and color poor. At 10:00 A.M. anteroposterior and right lateral roentgenograms of the chest were made. These films are illustrated in Fig. 1. The infant expired at 7:05 P.M.

Post-mortem examination.—The pleural spaces were carefully entered under water and a considerable amount of air escaped from the right. No air escaped from the left pleural space. There was no ME. Numerous subpleural blebs of air were present on all lobes of the right lung. The uncut lungs were not subjected to fixation. The lungs were not examined with a dissecting microscope.

Since most of the histologic findings in all patients (except in Case 4) were similar, the findings in this patient will be used as a basic description. Brief comparative descriptions will be given in the subsequent cases. Similarly, Figs. 9, 13, and 14 may be taken as illustrative of all cases (except Case 4).

Sections for microscopic examination were made from two areas. The sites from which the blocks were taken are not known. The largest bronchus had a wrinkled lining. In the lumen there was a long, slender cord of fibrin, desquamated mucosa, and a few erythrocytes and granulocytes. The smaller bronchi contained masses of fibrin which sometimes contained incorporated neutrophiles. Many of the bronchi and bronchioles were completely filled with amniotic fluid debris. Only a few of the small bronchioles were intact. Most were markedly dilated and filled with keratinized epithelium, erythrocytes, neutrophiles, and occasionally masses of fibrin. Frequently the bronchiolar wall formed a small segment of the wall of an irregular defect filled either with blood or amniotic fluid debris. Some of the spaces were partially empty. Others were lined with a thick layer of fibrin.

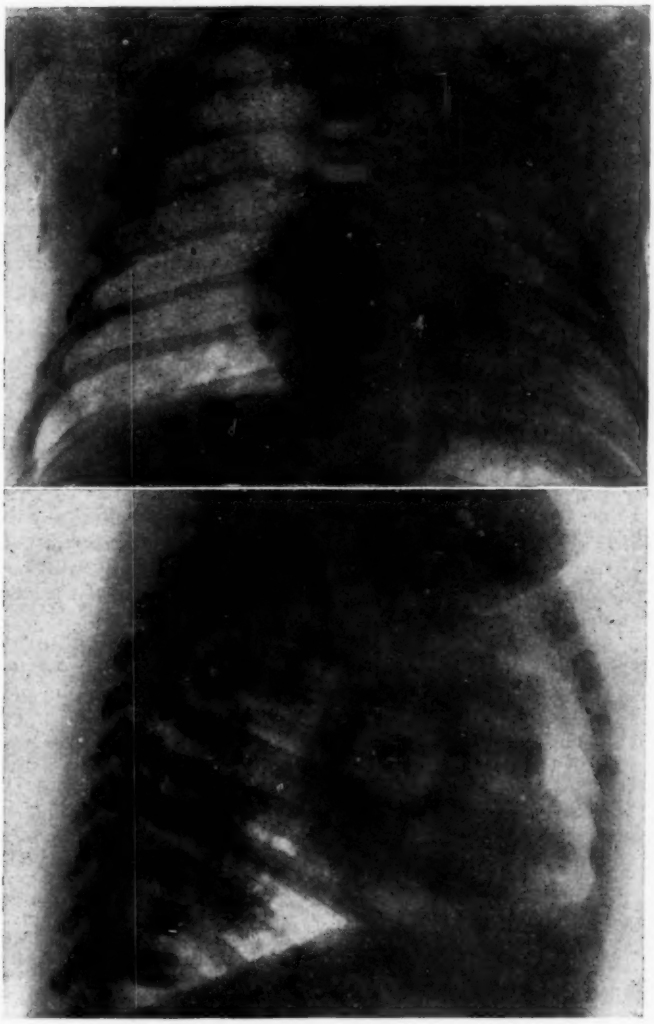
Very few alveoli contained air. The alveolar walls were markedly congested. There were large areas of hemorrhage and areas of collapsed alveoli. In small foci the air spaces were filled with neutrophiles. Scattered through the sections were round, ovoid, or dumbbell shaped defects with compressed linings. Frequently, the spaces consisted partially or entirely of markedly dilated bronchioles.

Long, wide, shredded defects, which contained varying amounts of blood, extended along the septa into the pleura. Most contained only small amounts of blood, but elongated hemorrhages were noted in the septa and pleura. Irregular defects, sometimes occurring in successive layers, were noted around large blood vessels and bronchi. Some of these structures were almost completely detached from the surrounding tissues. Similar tears were noted around smaller blood vessels. In addition, there were ovoid spaces with smooth linings which closely resembled markedly dilated capillaries, occurring particularly around medium sized vessels. Some of the blood vessels were markedly congested. Others were collapsed and contained little blood. Sometimes the blood only partially filled the lumen.

The remainder of the examination was essentially negative. There was neither cervical nor retroperitoneal emphysema. The cranial cavity was not entered.

CASE 2.—Infant S., a white girl, was born Oct. 27, 1943, at 2:15 P.M., weighing 3,000 Gm. Labor was complicated by prolapse of the umbilical cord, and the infant was delivered by version and extraction. Resuscitation was very difficult and included the use of a tracheal catheter and two intracardiac injections of epinephrine. After an hour the infant's color

A.



B.

Fig. 1.—*A*, Case 1. AP view with the infant lying on his back. There is atelectasis of the left upper lobe. There is marked emphysema of the right lung and probably of the left lower lobe. There is a small right PT. The margin of the right lung is discernible in the region of the right upper thorax. Either the air in the right pleural space, or the emphysematous right lung, seems to extend across the midline to the left of the vertebral column. This probably explains the substernal collection of air seen in the left lateral view.

B, Lateral view with the infant lying on his left side. There is a large collection of substernal air. This substernal air is seemingly in the anterior mediastinal space. This, however, is probably air in the right pleural sac herniating across the midline in the anterior mediastinal space (See Fig. 1, *A*). Post-mortem examination showed a right PT and extensive right PIE, but no ME.

improved except for occasional attacks of cyanosis. Moist râles could be heard throughout both lungs. In a few hours continuous cyanosis recurred, accompanied by dyspnea. At the age of 5 hours a left PT was diagnosed.

At the age of 7 hours the infant was admitted to the St. Louis Children's Hospital. Physical examination showed dyspnea, cyanosis in spite of continuous administration of oxygen, and signs typical of left PT, including shift of the heart to the right. Fluoroscopy showed a partial left PT (about 50 per cent), with shift of the heart to the right of the sternum. A left thoracentesis obtained 50 c.c. of air. Following this the infant seemed to improve, and fluoroscopy showed the amount of PT to be decreased and the heart in a normal position. During this period of time both epinephrine and Coramine had been administered subcutaneously.

At the age of 10 hours, dyspnea and cyanosis recurred. A left thoracentesis was repeated, but this time it was found impossible to reduce the amount of air in the left pleural space: the PT was under considerable tension, and air apparently entered as rapidly as it could be aspirated.

At the age of 12 hours a closed left thoracotomy was performed and the catheter connected to a water trap. Air bubbled out with each expiration. Following this procedure the cyanosis disappeared, but the dyspnea continued. Finally, breathing became irregular with long periods of apnea. More epinephrine and coramine were administered subcutaneously. The infant expired at 6:15 A.M., October 28, at the age of 16 hours.

Post-mortem examination.—The pleural spaces were not entered under water. A left PT had previously been demonstrated by fluoroscopy. There was no ME. There was no gross PIE. The lungs were not subjected to fixation before cutting. All lobes of the lung were firm and dark red; they sank in water. On the posterior surface of the left lower lobe there were several perforations, probably needle punctures complicating the thoracenteses. The lungs were not examined with a dissecting microscope.

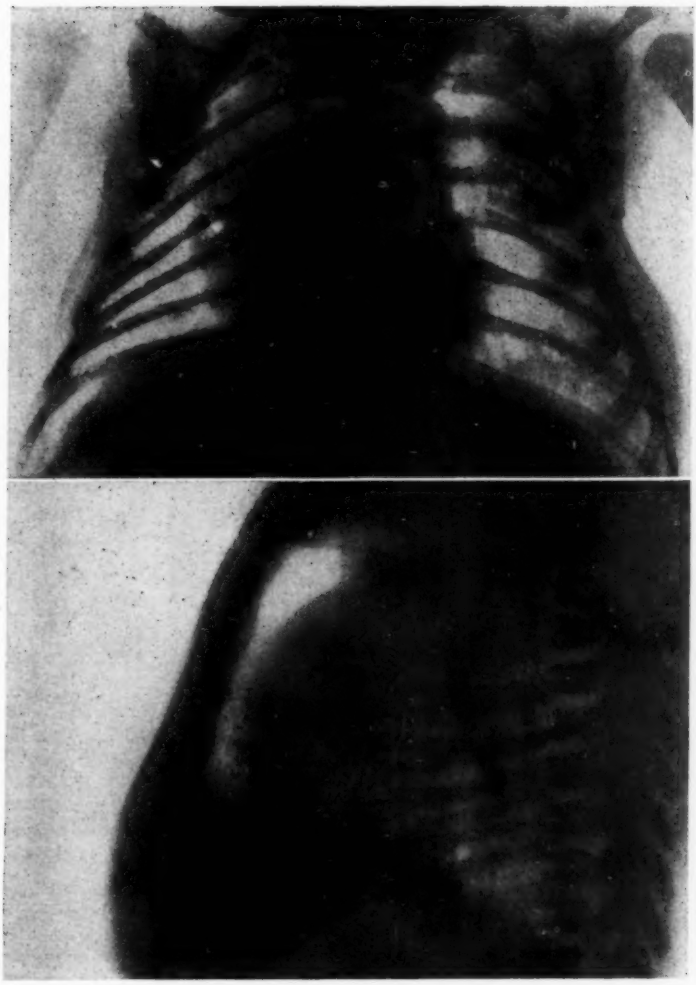
Sections for microscopic examination were made from two areas. The sites from which the blocks were taken are not known. Most of the bronchioles were moderately dilated. Some were ruptured, and several contained amniotic fluid debris. There was moderate to marked diffuse ectasia throughout the sections with small foci of compressed alveoli. The largest air spaces noted were adjacent to or communicating with bronchioles. The alveolar walls were congested and thickened; small hemorrhages were present. In some areas where the ectasia was most marked, the bronchioles were partially or completely collapsed. The interlobular septa were markedly widened, with either formation of elongated defects, frequently extending into the pleura, or with an extremely loose arrangement of the connective tissue fibers, forming wide interstitial spaces. Large ovoid spaces with a smooth lining contour were noted in the septa, usually occurring adjacent to blood vessels. A thin layer of fibrin was attached to the pleura.

The adrenals showed marked bilateral medullary hemorrhage. The remainder of the examination was essentially negative. There was neither cervical nor retroperitoneal emphysema. The brain was negative.

CASE 3.—Infant G., a boy, was born Aug. 18, 1945, at 10:12 P.M., at Hermann Hospital, weighing 2,700 Gm. Delivery was spontaneous of a 15-year-old white primipara. Position was left occipitoanterior. The mother was admitted in advanced labor but apparently the first two stages lasted about seven hours altogether. She delivered without anesthesia. She suffered a second degree laceration. The amniotic fluid contained a large amount of meconium and the infant's skin was covered with meconium. Although the infant's mouth and pharynx were full of mucus and meconium, respiration was prompt and spontaneous.

On August 19, at 9:00 A.M., the infant was noted to be cyanotic, and by 11:00 A.M. marked respiratory distress was evident. The chest was markedly expanded with minimal respiratory excursion. Expiration seemed difficult and incomplete. Resonance to percussion was questionably impaired over the right chest. Moist râles were heard in both bases,

A.



B.

Fig. 2.—*A*, Case 3. AP view with the infant lying on his back. The reason for the marked shift of the heart and other mediastinal structures to the right is not apparent. Another AP view taken at the same time suggested emphysema of the left upper lobe or a large collection of air in the left upper mediastinum, or between the mediastinum and left upper lobe.

B, Lateral view with the infant lying on his right side. There is a large collection of substernal air, seemingly in the anterior and superior mediastinal spaces. Post-mortem examination showed bilateral PT and extensive bilateral PIE, but no ME.

but were more marked on the right. Heart sounds could be heard better to the right of the sternum than to the left. Oxygen was started and inhalations of 5 per cent carbon dioxide and 95 per cent oxygen were ordered.

During the afternoon the infant did not improve and his temperature rose to 103° F., possibly because of undue heat from the incubator in which he was placed. At 2:00 P.M., and again at 6:00 P.M. he was given 50 c.c. of normal saline subcutaneously.

At 6:30 P.M., anteroposterior and right lateral roentgenograms of the chest were made. These films are illustrated in Fig. 2.

The infant continued to do poorly and at 9:00 P.M. an attempt was made to aspirate air from the anterior mediastinum; no air was obtained. A left thoracentesis, however, obtained 25 c.c. of air. A right thoracentesis was not performed. The infant expired at 9:35 P.M.

Post-mortem examination.—The pleural spaces were carefully entered under water and several bubbles of air escaped from each side. There was no ME. Numerous subpleural blebs of air were present on all surfaces of all lobes. These blebs were particularly marked in the hilar regions. A drawing of the thoracic viscera is illustrated in Fig. 3.

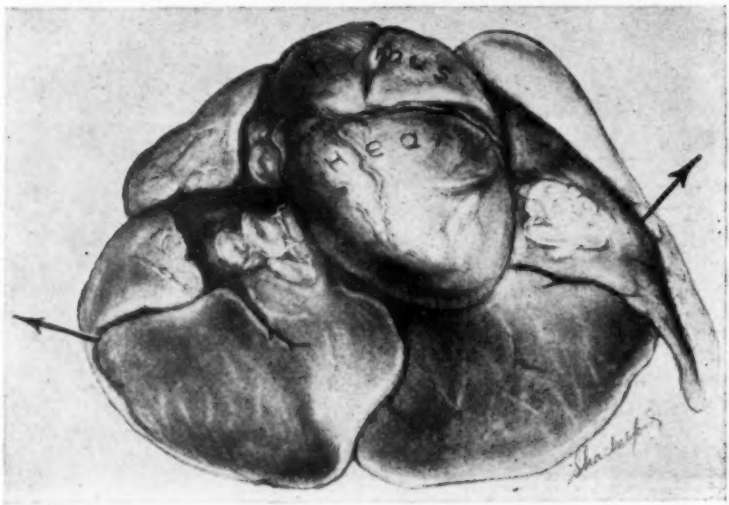


Fig. 3.—Case 3. A drawing of the thoracic viscera. Note the large subpleural blebs of air. Note the absence of ME.

After fixation of the lungs in 10 per cent formalin, they were cut and examined under a dissecting microscope. The same findings were present in all lobes; however, they were not so marked in the upper lobes. There was extensive perivascular interstitial emphysema. Extensive interstitial emphysema extended along connective tissue planes and along interlobular septa to the pleura. Some of the interstitial emphysema was in small pockets. All of these changes were particularly marked in the hilar regions. There was marked ectasia. Some idea as to the extent of these changes may be obtained from Figs. 4, 11, and 12.

A section from each lobe was taken for microscopic examination. Most of the bronchi and bronchioles were markedly dilated. Some were ruptured. Many of the bronchioles contained blood, and several contained meconium. Alveolar ectasia was marked.

Some of the lobules appeared cystic. Large defects were present in the septa and the pleura; in some of these blood was present. The defects communicated with alveoli. The perivascular spaces were exceptionally large.

Although the cranium was not entered, a cisternal puncture obtained grossly bloody fluid. The remainder of the examination was essentially negative. There was neither cervical nor retroperitoneal emphysema.

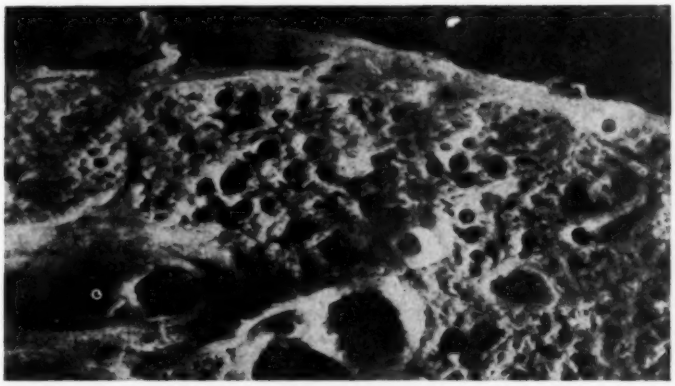


Fig. 4.—Case 3. Very low magnification (approximately ×7) of the cut surface of the fixed left lower lobe to show the marked ectasia. Some of these collections of air are in normal pathways and some are not.

CASE 4.—Infant G. L. S., a boy, was born Feb. 12, 1946, at 4:53 A.M., weighing 3,930 Gm. Delivery was spontaneous with episiotomy of a 23-year-old white primipara. Presentation was left occipitoanterior. The first two stages of labor lasted about four hours. The mother received 100 mg. of Demerol twice and 0.4 mg. of scopolamine once during labor. She received cyclopropane and oxygen during delivery. Respiration was prompt and spontaneous. The immediate neonatal period was uneventful. On February 13 a physical examination was negative, and the infant was discharged from the hospital.

On February 18, the infant became dyspneic and cyanotic. He was brought to the hospital emergency room. No diagnosis could be made and no treatment was instituted. The complaints subsided spontaneously.

On February 19, the infant developed diarrhea which was treated symptomatically and with subcutaneous fluids. On February 20 a physical examination was negative. On February 22 the infant again became dyspneic and cyanotic but only to a slight degree. The diarrhea continued.

On February 23, the infant was admitted to the Hermann Hospital. Physical examination showed moderate dehydration, slight cyanosis, and moderate dyspnea. The chest seemed to be hyperexpanded. The percussion note was hyperresonant over the entire chest. A blood count showed: hemoglobin, 20 Gm.; red blood cells, 5,400,000; white blood cells, 17,100; differential, a slight shift to the left. Urinalysis showed a heavy trace of albumin. Anteroposterior and left lateral roentgenograms of the chest were made. The anteroposterior view was negative; the left lateral view showed a small collection of substernal air. The infant was placed in a heat tent because his rectal temperature fell to 97.6° F. This may also possibly account for the temperature of 101° F. which he developed within the next twelve hours. The infant was given 250 c.c. of normal saline subcutaneously.

On February 24 at noon, the infant was critically ill and markedly dehydrated. The skin had a firm, almost hard texture. The infant was cyanotic and dyspneic. Respiration was

rapid but the excursion was shallow. The chest was markedly expanded, apparently kept at full inspiration, and the sternum and anterior part of the chest seemed to protrude forward. Intravenous fluids were begun and after the infant had received about 80 c.c., heart action ceased, although respiration continued. On efforts to administer intracardiac epinephrine, air was obtained on the first two attempts. Then it was realized that a left PT was present and that the heart was to be found on the right side of the sternum. Following intracardiac epinephrine, heart action resumed. Oxygen had been started in the meantime. On left thoracentesis it was found impossible to reduce the amount of air in the left pleural space: the PT was under considerable tension, and air apparently entered as rapidly as it could be aspirated. At 1:15 P.M. anteroposterior and right lateral roentgenograms of the chest were made. These films are illustrated in Fig. 5. At 1:25 P.M. the anterior mediastinal space was aspirated and 30 c.c. of air obtained; however, the operator could not be certain that he was not in the left pleural space. A right thoracentesis obtained no air. A left thoracentesis again showed that it was impossible to evacuate all of the air from the left pleural space. Subcutaneous fluids were administered.

During the afternoon the infant continued to do poorly, remaining cyanotic with rapid, shallow respiration and an expanded chest. Heart action was irregular. Another attempt to evacuate air from the left pleural space failed: air entered as rapidly as it could be aspirated. The tension PT forced air out into the subcutaneous tissues in the region of the thoracenteses. Intracardiac epinephrine was repeated. The infant expired at about 6:40 P.M.

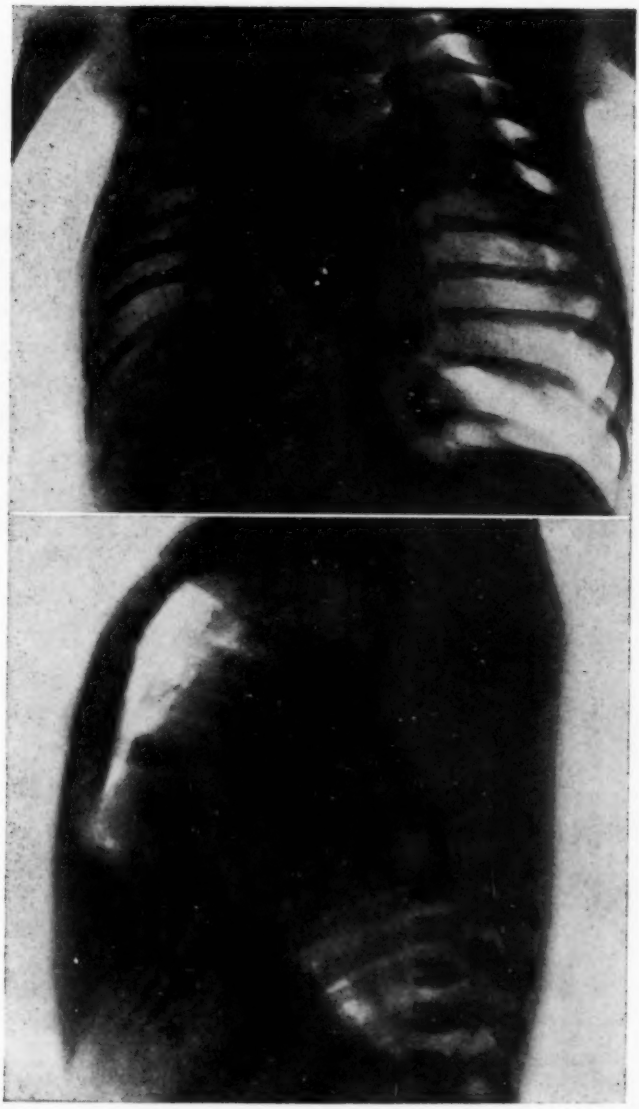
Post-mortem examination.—There was subcutaneous emphysema in the region of the left thoracenteses. The pleural spaces were carefully entered under water. A tension left PT and a small right PT were demonstrated. There was no ME. There was no gross PIE. Th uncut lungs were not subjected to fixation. The lungs were not examined with a dissecting microscope. Sections for microscopic examination were made from two areas. The sites from which the blocks were taken are not known. In the sections examined, there was slight congestion and a few small areas of complete atelectasis. These sections were not available for subsequent review. The heart showed a patent ductus arteriosus. Microscopic examination of the ductus showed slight fibrosis and lymphocytic infiltration in the adventitia; the intima was replaced by almost acellular material in which lay a few fibroblasts. The remainder of the examination was essentially negative. There was neither cervical nor retroperitoneal emphysema. The brain was negative.

CASE 5.—Infant W., a boy, was born Feb. 20, 1946, at Hermann Hospital, at 2:09 A.M., weighing 3,500 Gm. Delivery was accomplished with low forceps without episiotomy. Position was left occipitoanterior. The mother was a 22-year-old Negro, gravida 3, para 2. The first two stages of labor lasted about ten hours. The mother received 100 mg. of demerol intramuscularly during labor and Pentothal Sodium intravenously during delivery. The infant was born with the umbilical cord around his neck. The skin was deeply stained with meconium. About two hours was required to establish respiration. A tracheal catheter, Coramine, oxygen, and artificial respiration (type not recorded) were all used. Finally the infant began to breathe in gasps.

The infant continued to do poorly. Oxygen was administered continuously. Respiration was rapid and shallow. At 11:00 A.M., physical examination showed marked molding of the head with overriding of the cranial bones. There was a hematoma of the right eye and scalp. The percussion note over the left chest was dull. At 2:00 P.M., anteroposterior and left lateral roentgenograms of the chest were made. These films are illustrated in Fig. 6.

At 2:45 P.M., the anterior mediastinal space was aspirated and 15 c.c. of air obtained. A left thoracentesis obtained 20 c.c. of air and a right thoracentesis obtained 8 c.c. of air. At 3:30 P.M., the roentgenographic examinations were repeated. These films are illustrated in Fig. 7. At 5:00 P.M., 180 c.c. of air was removed from the right pleural space. The infant expired at 5:45 P.M.

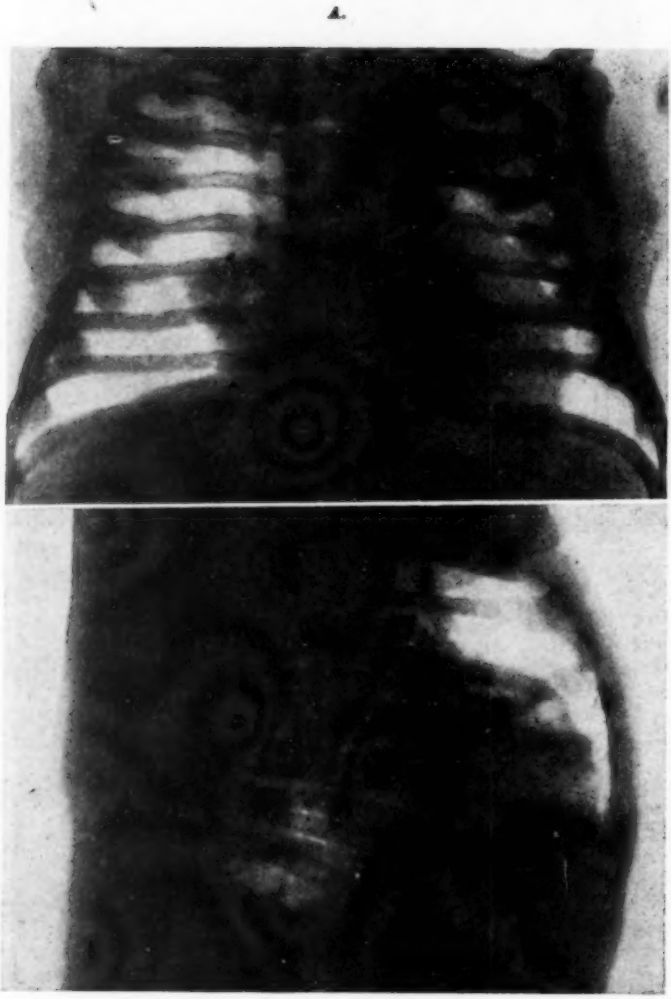
A.



B.

Fig. 5.—*A*, Case 4. AP view with the infant lying on his back. There is atelectasis of the right upper lobe. There is a partial left PT. It is surprising that there is not a larger left PT and a more marked collapse of the left lung, because thoracenteses demonstrated that the air in the left pleural cavity was under great tension (note how the left diaphragm is forced downward). This suggests that the further collapse of the left lung was prevented by trapped air, likely PIE.

***B*, Lateral view with the infant lying on his right side. There is a large collection of substernal air, seemingly in the anterior and superior mediastinal spaces. Post-mortem examination showed a tension left PT and a small right PT. There was no ME.**

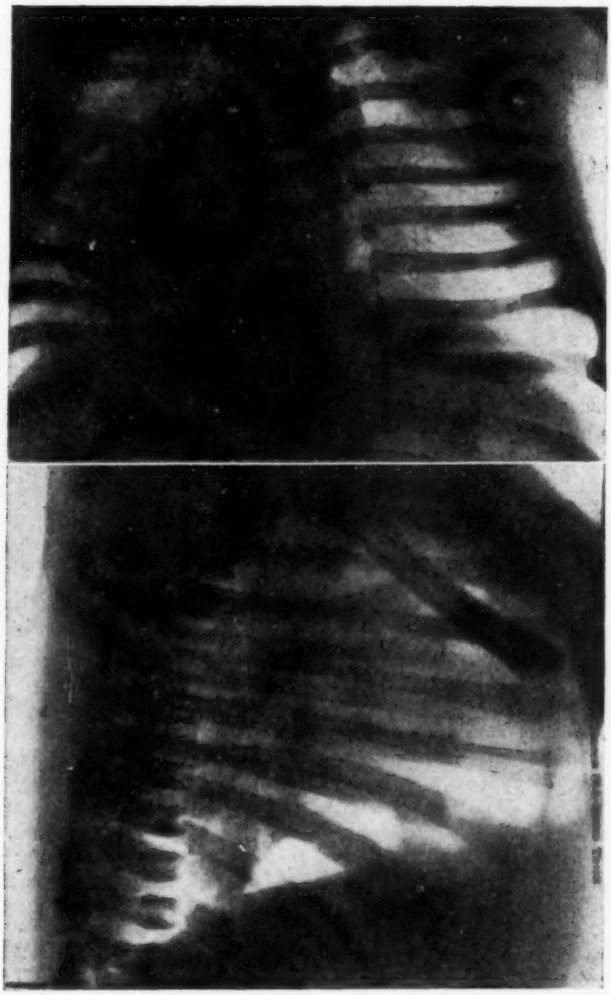


B.

Fig. 6.—*A*, Case 5 at 2:00 P.M. AP view with the infant lying on his back. There is some atelectasis of the left upper lobe. There is marked emphysema of the right lung and probably of the left lower lobe.

B, at 2:00 P.M. Lateral view with the infant lying on his left side. There is a large collection of substernal air, seemingly in the anterior and superior mediastinal spaces.

A.



B.

Fig. 7.—*A*, Case 5 at 3:30 P.M. AP view with the infant lying on his back. There is a partial left PT with a surprisingly marked shift of the heart and other mediastinal structures to the right for the small amount of left PT. At post-mortem examination the air in the left pleural space was found to be under very high tension. There was also extensive bilateral PIE which, in the case of the right lung, probably prevented any further shift of the heart and other mediastinal structures and which, in the case of the left lung, probably prevented any further collapse.

B, at 3:30 P.M. Lateral view with the infant lying on his left side. There is no substernal collection of air to suggest air in the anterior mediastinal space. Post-mortem examination, however, showed extensive ME.

Post-mortem examination.—The pleural spaces were carefully entered under water. A tension left PT was demonstrated. On the right a considerable quantity of air also escaped, about one-fourth as much as on the left. There was extensive ME. Numerous subpleural blebs of air were present on all surfaces of all lobes. These blebs were particularly marked in the hilar regions. A drawing of the thoracic viscera is illustrated in Fig. 8. The entire lungs were fixed in 10 per cent formalin before cutting. The lungs were not examined with a dissecting microscope.

Fig. 8.—Case 5. A drawing of the thoracic viscera. Note the large subpleural blebs of air. Note the extensive ME.

A section from each lobe was taken for microscopic examination. There was moderate dilatation and occasional rupture of the smaller bronchioles. The bronchioles and alveoli contained meconium and amniotic fluid debris. Alveolar ectasia was moderate in the right lung and slight in the left lung. Some of the defects in the septa and pleura of the right lung were so large that they were termed bullous. Perivascular emphysema was slight when compared to that found in the other patients. Congestion was equally marked in the large arteries and veins. Some of these changes are seen in Fig. 9.

The remainder of the examination was essentially negative. There was neither cervical nor retroperitoneal emphysema. The brain was negative.

CASE 6.—Infant S., a girl, was born July 10, 1946, at Hermann Hospital, at 5:30 P.M., weighing 3,260 Gm. Delivery was accomplished with low forceps without episiotomy. Position was left occipitoposterior, spontaneously rotating to left occipitoanterior. The mother was a 22-year-old Negro, gravida 5, para 4. She was admitted in advanced labor, but apparently the first two stages lasted about eleven hours altogether. The mother received Pentothal Sodium intravenously during delivery. The infant was born with the umbilical cord wrapped once around her neck. The amniotic fluid was stained with meconium and the infant's mouth and nose were full of meconium. Respiratory efforts were poor but included the use of the accessory muscles of respiration. Efforts at resuscitation included the use of a tracheal catheter, coramine, inhalations of oxygen, and a mechanical respirator.

The infant became cyanotic in spite of the continuous administration of oxygen. Respiration was labored and the chest was hyperexpanded. At first no breath sounds could be heard over the entire chest; later they could be heard accompanied by fine crackling râles. There was a large cephalohematoma.

The infant grew worse. Although the entire body was cyanotic, the cyanosis was much worse about the head and neck. The chest became markedly expanded, being maintained at extreme inspiration, with a small respiratory excursion. At 11:30 P.M. anteroposterior and left lateral roentgenograms of the chest were made. These films are illustrated in Fig. 10. At 11:45 P.M. the infant expired.

Post-mortem examination.—The pleural spaces were carefully entered under water. A large amount of air escaped from the right pleural sac so rapidly as to suggest that it had been under considerable tension. No air escaped from the left, however. There was no ME. Numerous subpleural blebs of air were present on all surfaces of the right lower, right middle, and left lower lobes.

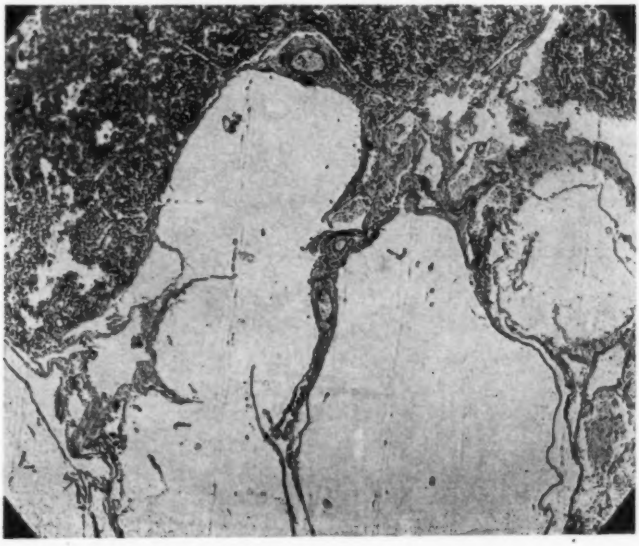


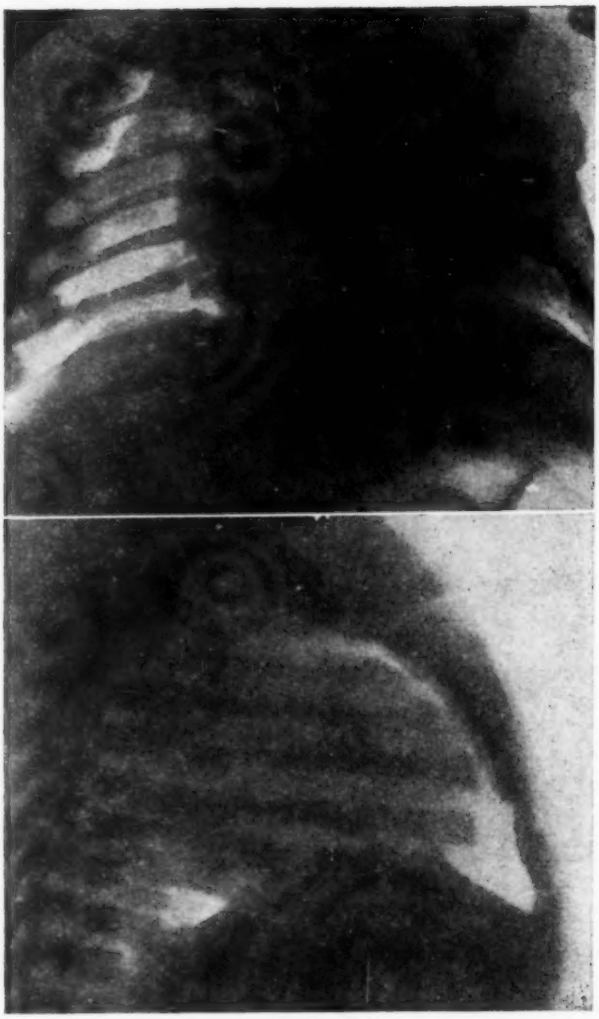
Fig. 9.—Case 5. Photomicrograph (approximately ×75) of a section from the right middle lobe. Note the dilated and torn alveoli, the hemorrhage, and the adjacent atelectatic area.

After fixation of the lungs in 10 per cent formalin, they were cut and examined under a dissecting microscope. The same findings were present in all lobes. There was extensive perivascular interstitial emphysema. Extensive interstitial emphysema extended along connective tissue planes and along interlobular septa to the pleura. Some of the interstitial emphysema was in small pockets. All of these changes were particularly marked in the hilar regions. There was marked ectasia. Some idea as to the extent of these changes may be obtained from Figs. 4, 11, and 12.

Sections were taken from each lobe for microscopic examination. Alveolar ectasia was marked. There was marked septal, pleural, and perivascular interstitial emphysema with apparent communications with alveoli. Hemorrhage into the spaces was marked. Some of these changes are seen in Figs. 13 and 14.

The heart showed a few small epicardial petechiae. The remainder of the examination was essentially negative. There was neither cervical nor retroperitoneal emphysema. The brain was negative.

A.



B.

Fig. 10.—*A*, Case 6. AP view with the infant lying on her back. There is atelectasis of almost the entire left lung except the lower portion of the left lower lobe. There is a partial right PT. It is surprising that there is not a larger right PT and a more marked collapse of the right lung, because autopsy demonstrated the PT to be a tension one. This suggests that the further collapse of the right lung was prevented by trapped air, likely PIE. Note that the air in the right pleural space seems to extend across the midline to the left of the vertebral column. This probably explains the substernal collection of air seen in the left lateral view (See Fig. 10B).

B, Lateral view with the infant lying on her left side. There is a collection of substernal air seemingly in the anterior mediastinal space. This, however, is probably air in the right pleural sac herniating across the midline in the anterior mediastinal space (See Fig. 10, *A*). Post-mortem examination showed a right tension PT and bilateral PIE, but no ME.

PATHOLOGY

The most revealing investigation of the pathogenesis and problem of air outside of the normal respiratory pathways has been that of Macklin. A review of both experimental and clinical aspects of which he is a co-author[5] should be studied by anyone interested in this subject. His work[8] demonstrates that the most likely and probably the most common sequence of events is as follows: air first passes through multiple and minute ruptures of the alveolar walls which border upon blood vessels, to form perivascular collections of air. From here the air progresses along the blood vessels to reach the mediastinum. From the mediastinum the air may travel superiorly to produce cervical subcutaneous emphysema, or travel inferiorly to produce retroperitoneal emphysema and pneumoperitoneum. Also from the mediastinum the air may travel into the interstitial tissue of the other lung, rupture into the pericardial sac, or rupture the mediastinal pleura to enter the pleural sac.

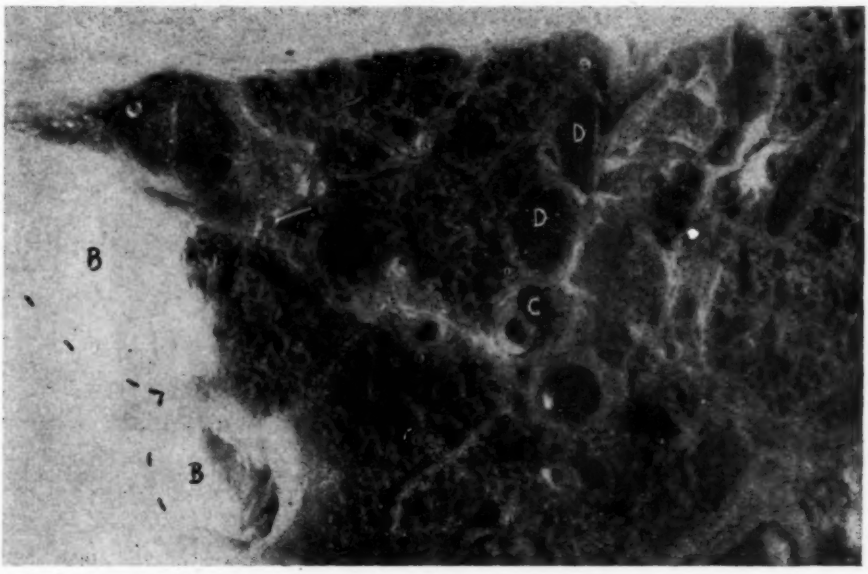


Fig. 11.—Case 6. Very low magnification (approximately ×5.5) of the cut surface of the fixed right lower lobe. *A*, Large collection of air dissecting along the interlobular septum to the visceral pleura. *B*, Large subpleural blebs. The visceral pleura was torn away along the superior interrupted line to form a subpleural bleb of air and split along the inferior interrupted line to form a bleb of air in the pleura. *C*, Semicircular collection of air about a blood vessel. *D*, Collections of air outside of the normal pathways. Other similar collections may be seen. Note the generalized ectasia.

All except one (Case 4) of the patients reported here had PIE, and in this exception the lungs were not fixed before cutting, the lungs were not examined with a dissecting microscope, and the stained sections were not available for subsequent review. Only one (Case 5) had ME. None had cervical subcutaneous emphysema. None had retroperitoneal emphysema. However, all six

patients had PT. The obvious implication is that, in the newborn infant, interstitial pulmonary air *can* rupture the visceral pleura to produce PT directly. This is apparently what happened to two of three rabbits when Macklin[8] subjected their lungs to general overinflation. Van Allen and associates[9] had a similar experience with the lungs of rabbits. This suggests that the structure of the lungs in the newborn infant more closely approximates that of the rabbit than that of various other animals used by both investigators. This does not mean that in the newborn infant the air may not enter the mediastinum. Certainly it did in Case 5. Fisher[10] has reported a newborn infant

Fig. 12.—Case 6. Very low magnification (approximately ×7) of the cut surface of the fixed right middle lobe. *A*, Perivascular collection of air which extends along an interlobular septum to surround a second vessel at *B* and continues beyond *C* to reach the pleura just outside the field. *D*, Collection of air outside of the normal pathways.

coming to autopsy who had PIE and ME but not PT. Nor does it mean that in the newborn infant ME may not precede PT so as to suggest that the first caused the second. Gumbiner and Cutler[11] mentioned such a case. It seems very likely that in newborn infants interstitial pulmonary air can produce PT by either of two mechanisms: (a) rupturing the visceral pleura directly, or (b) first producing ME and then rupturing the mediastinal pleura.

Joannides and Tsoulos[6] found that dogs, in whose pleural cavities a small rubber catheter had been introduced to allow the escape of air, survived an intratracheal blast of air fatal to other dogs not so treated. This emphasizes the importance of PT in airblock. However, in the newborn infant, PIE and ME may prove fatal without PT intervening.[10] Moreover, in the newborn

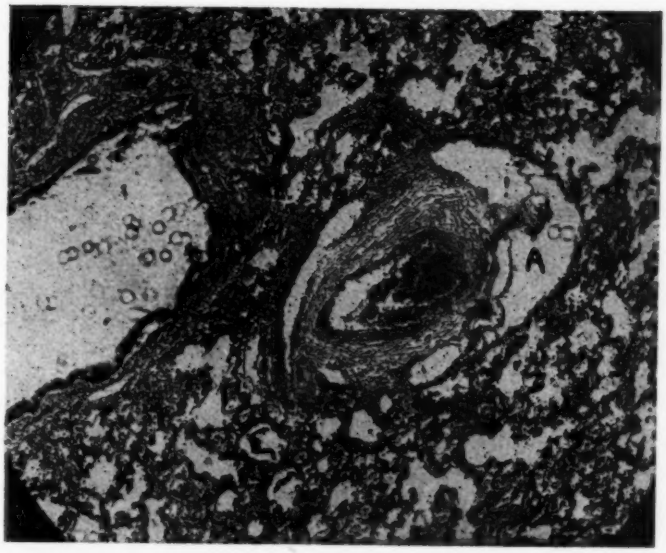


Fig. 13.—Case 6. Photomicrograph (approximately ×75) of a section from the left lower lobe. *A*, Perivascular collection of air with hemorrhage into the space thus produced. Note the thickened torn walls of the alveoli.

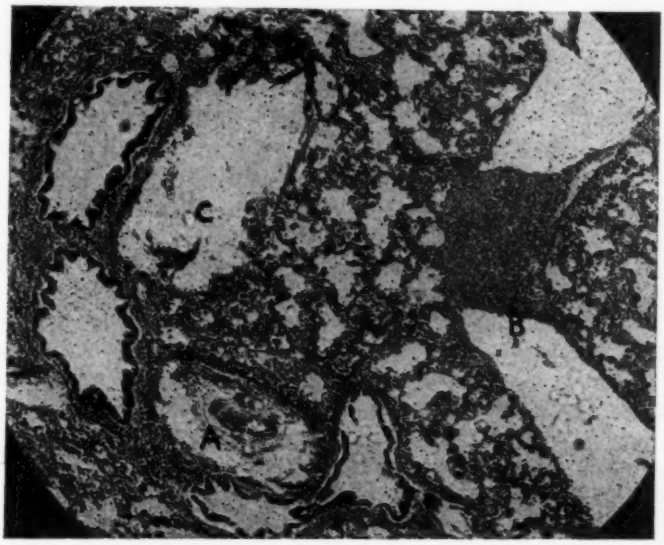


Fig. 14.—Case 6. Photomicrograph (approximately ×75) of a section from the left lower lobe. *A*, Perivascular collection of air with hemorrhage into the space thus produced, *B*, linear space, and *C*, oval space produced by air outside of the normal pathways. In each instance note the hemorrhage.

infant ME has been observed which showed evidence of reduction of the ME and clinical improvement coincident with the development of PT.[11] These views may be partially reconciled by the fact that pneumothoraces may vary in amount, in tension, and in whether unilateral or bilateral. Four (Cases 2, 4, 5, and 6) of our six patients indicate that in the presence of PIE an apparently small or moderate PT may be under a very high tension. The air trapped in the lung tissue prevents more than a moderate collapse. It has been stressed[3] that the pressure in a PT can be raised to greater than atmospheric only by expiration and not by inspiration. It is only during expiration that air in the lung is under a pressure greater than atmospheric, and may be under a pressure much greater than atmospheric during forced expiration. It may be easily understood that air trapped in the lung tissue, tending to splint it in an expanded form, might lead to strong expiratory effort.

In animals, ME alone may result in grave consequences, probably because of pressure on the great vessels.[12, 13] In newborn infants, aspiration of ME may relieve alarming symptoms.[11]

To our knowledge there is no report of an autopsy on a newborn infant in which the sole finding that could have caused the death was PIE. Nevertheless, at autopsy we have been deeply impressed with this finding, particularly when it is widespread. Being trapped in the lung, the air holds it in a state of inflation and splints it so as to prevent deflation. In some of our patients PIE was so extensive that it was difficult to understand how there could have been a significant respiratory excursion. This, together with the interference in the pulmonary circulation occasioned by compression of the vessels by the perivascular collections of air, might easily be fatal.

Certainly the possibility of PIE leading to air embolism (as already discussed) needs further investigation. Lindblom[14] found air in the circulatory system of newborn infants who failed to respond to strenuously applied methods of artificial respiration.

Apparently, extension of the air to extrathoracic locations is not a serious complication. Its appearance in the cervical subcutaneous tissues may be accompanied by clinical improvement, the pressure caused by the aberrant air inside the chest having been decreased.[3] Cervical subcutaneous emphysema,[7, 15, 16] retroperitoneal emphysema,[17] and pneumoperitoneum[7] have been reported complicating airblock in the newborn period.

One very interesting aspect of airblock is the probability of acute or, possibly better, subacute cor pulmonale. Pulmonary hypertension resulting from pressure on the pulmonary vessels by perivascular collections of air very likely increases considerably the work of the right ventricle. Some evidence of this, such as dilatation of the right ventricle, might be present at autopsy. We are not able to discuss this phase of the subject further, since these patients were not examined with this particularly in mind. However, evidence very indicative of pulmonary hypertension is mentioned later in a footnote under the discussion of etiology.

ETIOLOGY

As PIE is apparently the first and essential step in the production of airblock, a search for the cause narrows to this phase. Macklin's work[8] indicates: (a) that PIE may occur when alveoli are overinflated, particularly when accompanied by increased intra-alveolar pressure; and (b) that PIE may occur when the caliber of the pulmonary blood vessels is reduced, particularly when accompanied by increased intra-alveolar pressure. The caliber of the pulmonary blood vessels may be reduced by heart failure, stenosis or insufficiency of the pulmonary valve, or pulmonary embolism. However, it has been emphasized[3] that forced expiration will result in a decreased return of blood to the right heart and therefore a reduced amount of blood available for the pulmonary circulation. This will result in a correspondingly decreased caliber of the pulmonary blood vessels.

PIE, then, might result from compensatory overinflation occasioned by atelectasis. Four (Cases 1, 4, 5, 6) of our six patients had roentgenographic evidence of atelectasis. PIE might more easily be produced in the presence of congenital heart disease. Of sixty-nine patients with PT in the newborn period reviewed by DeCosta,[7] four had cardiac anomalies. One (Case 4) of our six patients had a patent ductus arteriosus. However, it is doubtful if much importance can be attached to this particular anomaly at this stage of life.* PIE might result from the irregular respiration sometimes caused by intracranial hemorrhage. Of three autopsied newborn infants with PT reported by Elkin,[17] all had intracranial hemorrhage. In four of our six patients the brain was negative. In two it was not examined; however, one of these two (Case 3) had bloody cisternal fluid.

In three (Cases 3, 5, and 6) of our six patients the amniotic fluid was stained with meconium. This is commonly taken as evidence of fetal distress, particularly anoxia. In two (Cases 3 and 5) microscopic sections of the lung showed meconium in the bronchioles. In one (Case 2) version and extraction was necessitated by prolapse of the umbilical cord. In two (Cases 5 and 6) the umbilical cord was wrapped around the infant's neck. Although one (Case 2) received two intracardiac injections of epinephrine before airblock was diagnosed, this does not necessarily indicate that the intrathoracic punctures led to the development of airblock. The condition of the infant was very poor, probably due to airblock, before the injections were administered. Moreover, in no other significant feature does this case differ from the other five. In four (Cases 1, 2, 5, and 6) it was very difficult to establish respiration. Two (Cases 1 and 5) received artificial respiration, but the type was not recorded. One (Case 6) received artificial respiration by means of a mechanical respirator. In four (Cases 1, 2, 5, and 6) efforts at resuscitation included the use of a tracheal catheter. In one (Case 4) the sequence of events suggests

*In this case the microscopic appearance of the ductus arteriosus indicated to the pathologist, who performed the autopsy, that it had once closed and reopened. This reopening might have been due to pulmonary hypertension resulting from pressure on the pulmonary vessels by perivascular collections of air. This suggests that in this particular case the PIE was the cause of the ductus' being open and not vice versa.

that airblock of mild to moderate severity was made much worse by hyperpnea occasioned by diarrheal acidosis.

It seems apparent that the factors related to the production of airblock experimentally[3] were easily present in these six patients.

Wilson and Farber[18] have shown that the expansion of airless lungs requires a much greater negative pressure than does normal inspiration. This was attributed to cohesion of the moist surfaces of the air passages in collapsed lungs. They concluded: "The first breath of a newborn baby may thus be its most difficult one. For a variable period after birth, especially vigorous inspirations must be maintained . . ." Striking changes in both the cells lining the alveoli and the connective tissue of the lung parenchyma are occasioned by the establishing of respiration. When these factors are considered, one wonders that PIE is not more frequent than is commonly believed; probably it is.

SYMPTOMS AND SIGNS

We do not think that a review of our patients adds any significant information to the symptomatology of airblock. This has been adequately outlined and discussed elsewhere.[2, 7, 11, 17, 19] For these reasons we are omitting a discussion of this aspect of the subject. We would, however, like to emphasize the striking appearance of some of these infants. The chest is expanded at or near full inspiration. In spite of effort, the infant is unable to more than partly expire. The respiratory excursion is therefore limited. This, together with cyanosis, should immediately suggest airblock.

ROENTGENOGRAPHIC FINDINGS

The criteria for a roentgenographic diagnosis of PT are quite well known and need no review here. As already mentioned, in the presence of PIE, the size of a PT may have no relationship to its pressure. The lung, splinted by the PIE, may be prevented from more than a moderate collapse; yet the PT may be under a very high tension, as evidenced by shift of the mediastinum and depression of the diaphragm.

The criteria for a roentgenographic diagnosis of pulmonary emphysema are also quite well known and need no review here. The differentiation of types of pulmonary emphysema may be difficult. As discussed by Caffey,[20] some information may be obtained by comparing inspiratory and expiratory findings: In compensatory emphysema, the heart and other mediastinal structures are pushed away from the involved lung on inspiration. In obstructive emphysema, the heart and other mediastinal structures are pushed toward the involved lung on inspiration, because of expansion of the other lung. In bilateral obstructive emphysema the cardiac and supracardiac shadows become smaller on expiration, because of the squeezing effect of the dilated lungs. This is contrary to what is normally seen.[20] Although in a comparison of inspiratory and expiratory findings PIE would no doubt act like obstructive emphysema, we did not include this procedure in our examination of these cases.

ME may be apparent on an anteroposterior or posteroanterior film* of the chest as evidenced by a linear shadow of air along either side of the mediastinum or along the border of the heart. However, in the newborn infant, ME may be present yet these views not show it. For this reason the value of a lateral film of the chest has been stressed,[11] particularly for air in the anterior portion of the mediastinum. In this view the air is visible in a collection just posterior to the sternum. In a previous report[2] we have expressed our doubts as to the value of this view, *if a PT is also present.* We believe that we now have evidence to support these doubts.

In the five patients (Cases 1, 3, 4, 5, and 6) who had lateral roentgenograms, all showed a substernal collection of air. Yet only one (Case 5) had ME. All five had PT. The obvious implication is that PT can cause an apparent substernal collection of air. A valid criticism may be that the infants were photographed lying on the side and that this apparent substernal air is due to shift of air inside the pleural space. However, this criticism would not be important if the PT were under considerable tension, as was present in four (Cases 2, 4, 5, and 6) of the five patients. A tension PT would hold its form because of its pressure. Our conclusion is that PT alone, particularly if under tension, can cause an apparent collection of substernal air, probably because of herniation of the anterior mediastinum. Actually, a review of the figures illustrating the roentgenograms of Cases 1, 3, and 5 suggests that the expanded lung of PIE can cause an apparent collection of substernal air (this would be particularly true if the film were slightly overexposed).

Moreover, the one patient (Case 5) who did have ME showed an apparent collection of substernal air at 2:00 P.M. but not at 3:30 P.M. This may be due to the fact that 15 c.c. of air was aspirated from the anterior mediastinum at 2:45 P.M. From the loculated type of ME seen at autopsy (see Fig. 8) it is difficult to believe that the aspiration removed a high proportion of the air. The obvious implication is that extensive ME can be present although a lateral roentgenogram of the chest does not show a substernal collection of air.

TREATMENT

It is probable that most cases of airblock in newborn infants are slight and cause no symptoms. In many more the symptoms are mild and spontaneous recovery will likely ensue. Treatment of such patients may well be restricted to increasing the oxygen concentration of inspired air.

In patients with airblock of more than moderate severity, more vigorous therapeutic measures may be indicated. If a large PT or a tension PT is present, aspiration is advisable. If a tension PT recurs it may be desirable to perform a closed thoracotomy and connect the tube to a water trap so as to allow air to escape but not enter. This was done in Case 2. The advisability of this procedure is suggested by animal experiments.[6] Air may be

*In newborn infants, it has been customary on radiology services with which the authors are familiar for anteroposterior views to be taken with the infant lying on the back. Lateral views are similarly taken with the infant lying on the side.

present in the mediastinum in an amount sufficient to warrant efforts at its removal. Surgical measures designed to relieve ME have been reviewed by Hammond.[21] Since aspiration of the anterior mediastinum may remove a significant amount of air,[11, 19] this step should be tried first. A therapeutic approach to the problem of PIE is more difficult. Removal of air from extensions such as ME or PT might relieve the pressure of the PIE.

CONCLUSIONS

1. Methods of post-mortem examination used in the newborn period should include measures to detect the presence of aberrant air.

2. In newborn infants, interstitial pulmonary air can produce pneumothorax by either of two mechanisms: (a) rupturing the visceral pleural directly, or (b) first producing mediastinal emphysema and then rupturing the mediastinal pleura.

3. The possibility of pulmonary interstitial emphysema producing air embolism needs further investigation.

4. The effect of pulmonary interstitial emphysema upon the heart needs further investigation.

5. Factors which may lead to the production of pulmonary interstitial emphysema are not infrequently present in the newborn period. The incidence of pulmonary interstitial emphysema in this period is undoubtedly higher than is commonly believed.

6. In the presence of pulmonary interstitial emphysema, the size of a pneumothorax may have no relationship to its pressure. The lung, splinted by the pulmonary interstitial emphysema, may be prevented from more than a moderate collapse, yet the pneumothorax be under a very high tension.

7. An apparent substernal collection of air in a lateral roentgenogram of the chest is not diagnostic of mediastinal emphysema, if a pneumothorax is also present. Moreover, mediastinal emphysema of significant proportions may exist without this roentgenographic sign being present.

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SULFADIAZINE PROPHYLAXIS IN CHILDREN AND ADOLESCENTS WITH INACTIVE RHEUMATIC FEVER

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THE use of sulfanilamide as a prophylactic agent against recurrences of active rheumatic fever in patients with inactive rheumatic fever has been reported by various observers.[1-10] The combined evidence of these articles pointed to a significantly lower rate of recurrence among the treated cases. In some series,[4, 8] however, the occurrence of various toxic manifestations from sulfanilamide constituted a considerable problem. With the advent of sulfadiazine, and encouraged by the favorable results in our four years' experience with sulfanilamide prophylaxis, it seemed advisable to make further observations using sulfadiazine daily as a prophylactic agent in inactive rheumatic fever. Not only was sulfadiazine known to be as effective against Beta hemolytic streptococci as sulfanilamide, but it also had the added advantages of a lower incidence of toxic manifestations and a somewhat more prolonged maintenance of drug concentration in the blood.

The present report deals with two years' experience with sulfadiazine given prophylactically to a group of inactive rheumatic subjects regularly under the care of the Bellevue Children's and Adolescents' Cardiac Clinics. The study was made from October, 1943, to October, 1945. Due to wartime curtailment in medical and laboratory staff, the group was of necessity smaller than one would have wished, the total number of patients having been curtailed to allow for closer individual supervision.

TREATED AND CONTROL GROUPS

Selection of Cases.—Two groups of equal size were selected for this study, one to receive prophylactic treatment, the other to serve as controls. All patients had a definitely established rheumatic past history, but were in the inactive stage both by clinical and laboratory criteria when admitted to the study groups. Each patient to receive sulfadiazine was matched as closely as possible with an individual control patient in respect to sex, age, years since last signs or symptoms of rheumatic activity, number and severity of previous rheumatic attacks, and degree of cardiac involvement.*

The length of previous prophylaxis was also matched in those control and sulfadiazine-treatment patients selected from the group that had received sulfanilamide prophylactically in earlier years.

Number of Patients and Length of Observation.—There were fifty-one individuals each in the treated and control groups; in both groups, twenty-eight patients had received sulfanilamide previously, while twenty-three were new to

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*Comparison of the treated and control groups in terms of the above factors is shown in Table I.

prophylactic treatment. Thirty-six subjects were treated throughout two years and fifteen through one year, the individual control patients being followed during concommitant years. Thus there were eighty-seven treated-patient years and eighty-seven control-patient years observed during the study.

Clinic Procedure.—Before admission to the treatment or control group, all patients were closely questioned and given a complete physical examination, and laboratory studies were made (erythrocyte sedimentation rate, electrocardiogram, and x-ray of the heart for size and shape) to serve as base line and to rule out rheumatic activity. No patient received the drug or was used as a control until three months or more after all evidence of previous rheumatic activity had ceased.

TABLE I. COMPARISON OF TREATED AND CONTROL GROUPS

COMPARISON FACTORS	TREATED GROUP (87 PATIENT YEARS) (%)	CONTROL GROUP (87 PATIENT YEARS) (%)
Sex		
Male	45	42
Female	55	58
Age Distribution in years		
4-8	6	6
9-12	17	15
13-16	54	51
17-21	23	28
Years Since Last Rheumatic Attack		
1	26	23
2	23	22
3	26	28
4	18	20
5	7	7
Number of Previous Attacks		
1	18	18
2	23	42
3	25	19
4	23	11
5	11	10
*Distribution of Cardiac Diagnoses**		
Possible and Potential Heart Disease	26	29
Enlarged heart		
Mitral insufficiency	22	18
Mitral insufficiency and stenosis	30	28
Mitral insufficiency and stenosis and aortic insufficiency	15	18
Mitral insufficiency and stenosis and aortic insufficiency and stenosis	7	7

*Diagnoses were made according to the criteria for the Classification and Diagnosis of Heart Disease: Heart Committee of the New York Tuberculosis and Health Association.

Patients in the treated group were examined, hemoglobin was determined and total white cell and differential counts and urinalysis were made once a week during the first seven weeks of sulfadiazine therapy. Subsequently, these patients were seen once a month for two months and at six-week intervals thereafter. Routine blood counts and urinalyses were not done at each visit beyond the eleventh week of treatnent. These were checked, however, approximately every three months in patients showing no abnormal laboratory findings. In the few subjects where suspicious blood or urine changes occurred, the patient returned at frequent intervals for further laboratory studies.

The control patients were examined routinely every two to three months and more frequently where rheumatic activity was suspected. In both control and treated groups, sedimentation rates and electrocardiograms were taken repeatedly whenever there were symptoms or clinical signs suggestive of rheumatic recurrence.

Drug Administration.—Children weighing less than 110 pounds received a daily single dose of 0.5 Gm. sulfadiazine in the morning. Those weighing over 110 pounds took a daily total of 1 Gm. of sulfadiazine, one 0.5 Gm. dose in the morning and one at bedtime. The 4-year-old child (weight 33 pounds) maintained a satisfactory level on 0.25 Gm. once a day. With these doses, blood sulfadiazine levels were found to average between 1.0 and 3.5 mg. per cent. The drug was administered continuously throughout the year.

Rheumatic Recurrences.—

Treated Group: One case of recurrent active rheumatic fever occurred during the eighty-seven patient years in the treated group.

L. B., a 14-year-old girl, whose rheumatic history started at the age of 6 years, had, by 9 years of age, developed a markedly enlarged heart and evidence of congestive failure sufficient to require digitalization. From the age of 10 years she received prophylactic sulfonamide during four seasons, getting along fairly well on restricted physical activity. In October, 1944, she developed pain in the chest and fever. She was found to have pericarditis and further evidence of congestive failure, gaining 5 pounds in one week. The liver was enlarged to four fingerbreadths below the costal margin. On absolute bed rest in the hospital and moderate doses of salicylates, the rheumatic activity and failure gradually receded. Despite repeated nose and throat cultures, no B hemolytic streptococci were found. However, there was a slight rise in the antistreptolysin titer of the blood.

Control Group: There were seven cases (six definite, one probable) of recurrent, active rheumatic fever in the eighty-seven patient years in the control group. The six definite cases included unequivocal signs of activity, both by clinical and laboratory evidence (Table II).

TABLE II. EVIDENCE OF RHEUMATIC ACTIVITY IN CONTROL CASES

CASE AGE (YR.)	CARDIAC DIAGNOSIS	FEVER	ARTHRITIS	TACHYCARDIA	DEVELOPMENT OF NEW MURMUR	ELEVATED SEDIMENTATION RATE	PROLONGATION OF P-R INTERVAL	INCREASE IN SIZE OF HEART BY X-RAY
W. K. 9	Possible and Potential	+	+	+	-	+	-	+
R. C. 13	Possible and Potential	-	+	-	+	-	-	+
J. P. 14	Possible and Potential	+	+	+	+	+	+	+
E. C. 14	EH MI MS AI	+	+	+	-	+	+	-
P. C. 17	EH MI MS AI	+	+	+	-	+	-	+
A. D. 17	EH MI MS AI AS	+	+	+	-	+	+	+

EH = enlarged heart; MI = mitral insufficiency; MS = mitral stenosis; AI = aortic insufficiency; AS = aortic stenosis.

The one control patient considered as probably active was a 20-year-old girl with an early onset of rheumatic history and advanced heart disease. She had received prophylactic sulfanilamide for three seasons until July, 1942. After that date without sulfa-prophylaxis there was no evidence of rheumatic activity until November, 1944. She then developed precordial pain, auricular fibrillation, and rapidly progressive congestive failure. Her period of observation in the hospital was only two days when she was taken home and died shortly thereafter. Post-mortem study was not obtainable.

Toxicity.—In the group of patients treated with prophylactic sulfadiazine we encountered no toxicity necessitating permanent cessation of treatment. One child complained of some dizziness and fatigue during the first weeks of taking the drug, but these symptoms subsided without withdrawal of sulfadiazine. In no case did blood counts show any total white cell count below 4,000 or polymorphonuclear cell count below 38 per cent. In a few instances, counts between 4,000 and 5,000 were found, and in other few instances, polymorphonuclear counts between 38 and 50 per cent. Where these occurred, blood counts were followed at frequent intervals, but all soon returned to normal range without stopping the drug. In only one child was the drug stopped for four days because of a low total white cell count (4,000), and then reinstituted without difficulty.

With the small daily dose of prophylactic sulfadiazine we did not encounter any renal complications. Rare red cells were seen in a few urine specimens and an occasional trace of albumin was reported, but it is significant that these findings were not persistent in any patient when another urine specimen was examined within a short period of time or on later examination.

DISCUSSION

In this group of inactive rheumatic subjects, results with sulfadiazine as a prophylactic agent against recurrences proved to be as satisfactory as those obtained from sulfanilamide. With closely matched groups, the incidence of a single recurrence in the treated group (1.2 per cent) in contrast to one probable and six definite recurrences in the control group (8.0 per cent) is significant. The relatively low rate of recurrence in the control group is of interest and may be partially explained as related to a rather low general incidence of rheumatic activity during the same time interval as observed both in the rest of the Bellevue Children's and Adolescent's Cardiac Clinics and on the wards of the Children's Medical Service.

Concerning administration of the drug, the use of less frequent doses once or twice a day with sulfadiazine as compared to twice or three times a day with sulfanilamide proved to be a distinct asset. Where daily medication must be taken regularly over a period of months and years, cooperation on the part of the patient is best when the number of daily doses is reduced to a minimum. Previously, sulfa-prophylaxis was discontinued during the summer and restarted in the fall.[9] In 1943, the continuous use of prophylaxis throughout the year was instituted, as we had observed a significant number of cases of active rheumatic fever, both initial and recurrent attacks, occurring during the sum-

mer months of several preceding years. This change also obviated the increased clinic and laboratory load necessary when reinstituting sulfa-prophylaxis in the fall.

Despite our good fortune in not encountering any serious toxic manifestations, it is to be emphasized that such should be watched for and that the total white cell and polymorphonuclear counts should be followed at least through the first two months of prophylactic therapy. Urine specimens should be examined for albumin and red cells at regular intervals throughout treatment.[11]

The possible danger of development and infection from sulfa-resistant strains of hemolytic streptococci was watched for following news of such developments in certain of the armed service camps. No such cases occurred during this study. It should be noted that this treated group is small and also that the individuals we dealt with lived in homes widely scattered throughout New York City. These two points are in important contrast to the tremendous numbers treated and the close, constant contact of camp conditions notable in the reports on development of sulfa-resistant strains following sulfadiazine prophylaxis in the armed forces.[12, 13]

SUMMARY

1. In fifty-one inactive rheumatic children and adolescents treated with prophylactic sulfadiazine for eighty-seven patient years, one recurrence of active rheumatic fever was observed. In an equal number of closely matched controls observed throughout the same time period, one probable and six definite recurrences of active rheumatic fever occurred.

2. No instances of sulfadiazine toxicity necessitating permanent discontinuance of treatment were encountered.

3. It would seem more protective to the patient and more convenient in a clinic group to maintain prophylaxis throughout the year.

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THE CARDIOPATHY OF SICKLE CELL ANEMIA AND ITS DIFFERENTIATION FROM RHEUMATIC CARDITIS

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IN CLINICS such as our own where there is a considerable Negro population, the problem of differentiating between rheumatic heart disease and the cardiac manifestations of sickle cell anemia is often troublesome. Accurate distinction between the two diseases is important in deciding upon the proper management of the individual case.

The literature on heart disturbances in sickle cell anemia was reviewed in 1942 by Klinefelter,[1] who added twelve cases of his own. Klinefelter pointed out certain peculiarities of the disorder which serve to distinguish it not only from rheumatic carditis, but also from the changes found in other forms of anemia. Wintrobe,[2] on the other hand, feels that the changes are similar to, if not identical with, those found in other chronic anemias. In relation to diagnosis, perhaps the most important of Klinefelter's conclusions is that rheumatic fever and sickle cell anemia do not coincide in the same patient. While he apparently overlooked Walker and Murphy's report[3] in which both conditions were found at autopsy, proved exceptions to the rule appear to be exceedingly rare.

Nearly all reported cases of cardiopathy in sickle cell anemia have been in adults. In children, Hamman[4] reported a case in 1933, and King and Janeway[5] another in 1937. The following case is reported because of the apparent infrequency of the disorder in children and because it illustrates the diagnostic difficulties.

CASE REPORT

M. W., a 12-year-old Negro girl, was first seen at the Stanford Children's Clinic in 1944. Her presenting complaints began at the age of 9 years when she developed "aching joints all over the body." These were associated with a low-grade fever and extreme fatigue. She was taken to a hospital where the diagnosis of acute rheumatic fever with heart disease and sickle cell anemia was made, and bed rest ordered. Eight months later the joint pains and fever recurred and she was hospitalized again with the same diagnosis, spending the following two months in bed. From this time until shortly before we first saw her in 1944 she had had no symptoms other than being more easily fatigued than her siblings. Three weeks previously, she had complained of backache. At no time had she had swollen joints, jaundice, or abdominal distress. The family history revealed that three siblings aged 9, 13, and 19 years had died of "yellow jaundice." The mother did not have symptoms, although sickle cells were demonstrated in her blood. The patient was admitted to the Children's Ward of Stanford University Hospital on June 16, 1944.

Physical examination revealed a well-developed and nourished 12-year-old Negro girl in no acute distress. The skin showed no icterus. Examination of the head, including fundi, was entirely negative. There were large submandibular lymph nodes. The lungs were clear to percussion and auscultation. There was a prominent, diffuse pulsation seen in the fifth interspace one centimeter lateral to the midclavicular line. A systolic thrill was felt in this position. The heart sounds were clearly heard at the base with P_2 greater than A_2. Only the first sound was well heard at the apex. A grade 4 systolic murmur was present over the entire pre-

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cordium with its maximum intensity over the lower part of the heart. No diastolic murmur nor third heart sound was found. The rest of the physical examination, including abdomen, back, and extremities was entirely negative.

Laboratory studies showed hemoglobin of 7.74 Gm. per cent, 2.32 million red cells with 7.5 per cent reticulocytes, and 14,900 white cells with normal distribution. Heavy sickling of the red cells was observed in the counting chamber. Erythrocyte sedimentation rate (Cutler) was 2 mm. per hour. Urine, blood Wassermann, stool, vaginal, and nasopharyngeal cultures were all negative. Venous pressure was 6 cm. of water; circulation time (decholin, arm-to-tongue), thirteen seconds. X-rays of the skeleton disclosed marked thickening of the cranial vault. The cardiac shadow was enlarged and "of mitral configuration with a markedly prominent left auricle which displaces the esophagus" (Fig. 1). The electrocardiogram revealed a P-R interval of 0.25 second and notched P waves in all leads. The RS-T segment was elevated in Leads II and III (Fig. 2). These findings have not changed in the many subsequent electrocardiograms. Stethograms taken June 13, 1944, showed a murmur occupying all of systole, and a less intense, early, diastolic murmur before and after a third heart sound (Fig. 3).

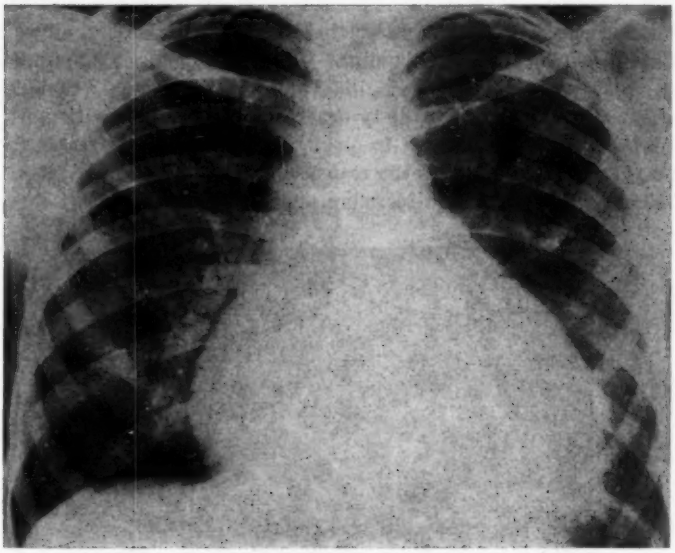
The patient was given several blood transfusions. While on the ward she had one sickle cell crisis, consisting of severe pain in the arms and back. This was relieved by morphine sulfate. She was dismissed on June 13, 1944, with a diagnosis of rheumatic heart disease and sickle cell anemia.

During the next nine months she was seen regularly in the Children's Clinic and was observed to be getting along fairly well on limited activity. There were brief episodes of backache, and toward the end of this period she was more easily fatigued. Her hemoglobin having fallen gradually from 11.4 Gm. per cent to 7.9 Gm. per cent, she was again admitted to the ward March 13, 1945, for transfusion. During this entry her antistreptolysin titer was found to be 100 units per cubic centimeter (normal) and her icterus index was 20 units. The sedimentation rate with low carbon dioxide tension was 21.5 mm. and with high carbon dioxide tension, 9 mm. per hour. The physical examination and other laboratory findings were similar to those of the previous entry. Because of the persistently low erythrocyte sedimentation rate and normal antistreptolysin titer, the diagnosis of rheumatic fever was questioned. It was felt that all the findings, including the prolonged P-R interval, were compatible with sickle cell heart. She was discharged March 23, 1945, with this diagnosis and it was decided that her activity at home needed only to be self-limited.

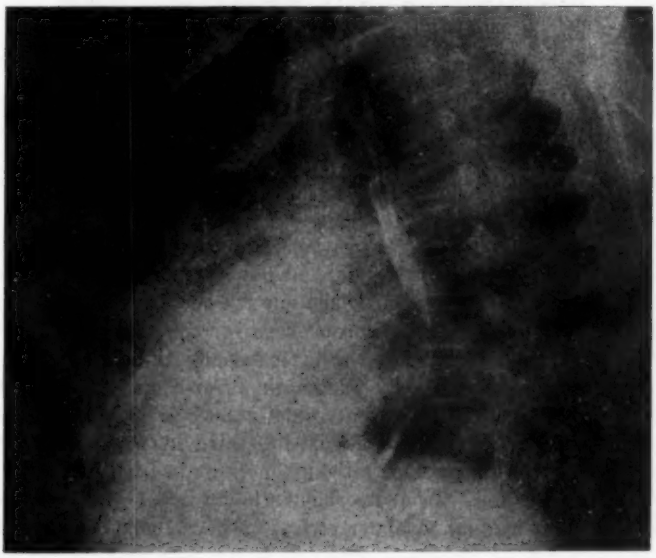
She has had four subsequent hospital entries for transfusions. It is of interest that she has had eleven of these, and the child herself would come voluntarily to the clinic requesting them. She told us that she developed loss of appetite, irritability, and extreme fatigue whenever her hemoglobin was low. In December of 1945, her heart was found to be 5 cm. wider by x-ray, and further enlargement was noted in the left auricle. The diastolic murmur previously demonstrated only by sound tracings had now become audible. Jaundice was first noticed by the patient in January, 1946. Her liver became palpable 3 fingerbreadths below the right costal margin in April of this year and subsequently could not be felt. Physical examination and stethograms repeated in June, 1946, showed, in addition to the early and middiastolic murmurs previously noted, a low-pitched presystolic murmur at the apex (Fig. 4).

DISCUSSION

The history in rheumatic infection and sickle cell anemia often displays similarities with respect to fatigability, failure to gain weight, dyspnea, pains in the extremities, and abdominal distress. The last of these may take the form of vague complaints with nausea and vomiting or may manifest itself by violent symptoms of pain, tenderness, and involuntary spasm.[6] We have seen instances of both diseases associated with the signs of peritonitis. Often a distinction can be drawn based on the location of pain in the extremities. Characteristically, it should be found in the joints in rheumatic fever and along the



A.



B.

Fig. 1.—*A*, Roentgenogram of the heart on Aug. 11, 1944, demonstrating diffuse enlargement. *B*, Roentgenogram of the heart in right anterior oblique view demonstrating backward displacement of the barium-filled esophagus by the left auricle.

course of the long bones in sickle cell anemia. It has been our observation that the children themselves usually refer their pain to *joints* so that we feel this is not often a helpful differential point. Conversely, many of our milder rheumatics complain of muscular pain. T. Duckett Jones[7] states that this is the rule in children. He feels that the typical migratory polyarthritis with redness, heat, and swelling is encountered frequently in adults but infrequently in children. Of greater significance is the response of the pain to salicylates. Usually pain of sickle cell anemia requires more energetic sedation.

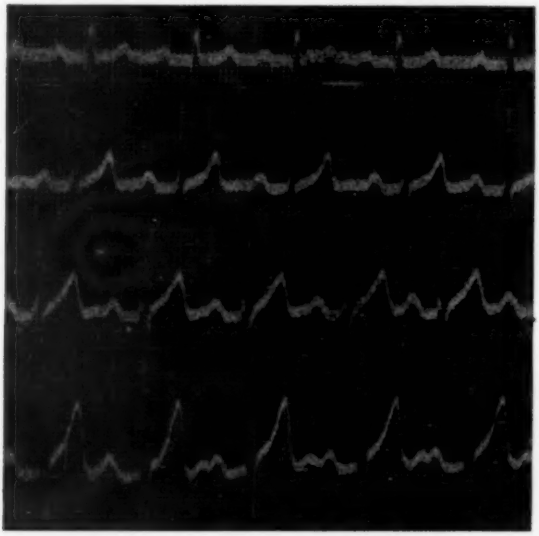


Fig. 2.—Electrocardiogram taken May 10, 1944. Note the P-R interval of 0.25 seconds, notched P waves, and elevation of R-ST segments in Leads II and III.

Careful evaluation of all the physical findings is of importance. Such features as jaundice, generalized lymphadenopathy, hepatomegaly, leg ulcers, and either a large spleen or a small, hard one are commonly found in sickle cell anemia and are not part of the syndrome seen in rheumatic fever. Conversely, developing heart disease associated with rheumatic nodules, erythema multiforme, or chorea, if present, make rheumatic fever more likely. The greatest confusion exists in respect to signs present in the heart. Both conditions may be associated with enlargement, tachycardia, third heart sounds, systolic and diastolic murmurs. Enlargement, although present in both instances, is attributable to different causes. In acute rheumatic carditis the myocardial damage produces dilatation leading to hypertrophy, or in rheumatic fever with mitral stenosis the abnormally produced pressure puts strain first on the left auricle and later on the right heart, causing enlargement of these parts. The best theory to explain the diffusely enlarged sickle cell heart appears to be that the long-standing anemia increases cardiac output and eventually such an overload leads to a dilatation and hypertrophy affecting all the chambers equally. On

auscultation the signs may be identical. Thus, in 1942, Klinefelter,[1] calling attention to the common practice of assuming that apical diastolic murmurs indicate mitral stenosis, analyzed eleven autopsies of patients, all of whom had sickle cell anemia and two in whom a secondary diagnosis of rheumatic fever was made. Actually, there were no examples of valvular scarring, although all the patients had had diastolic murmurs during life. He postulated a relative stenosis resulting from the failure of the mitral ring to expand along with the dilating myocardium. Earlier, Bland and associates,[6] in discussing the production of mitral murmurs in rheumatic fever, pointed out that even in this disease, presystolic murmurs may be heard in patients who prove at necropsy to have only

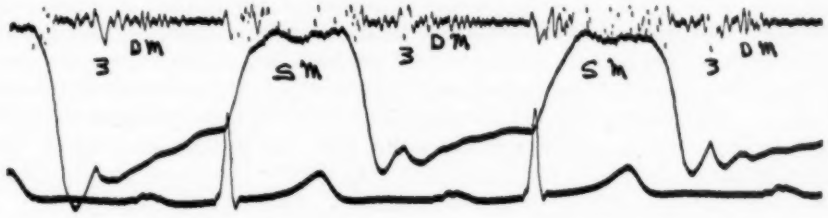


Fig. 3.—Stethogram at the apex on June 13, 1944, demonstrating a murmur which fills systole. An early diastolic murmur is shown both preceding and following a third heart sound.

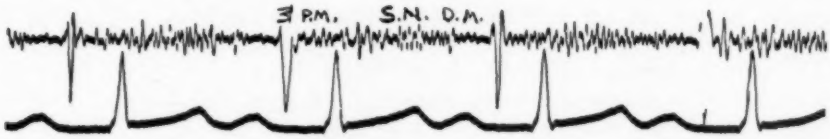


Fig. 4.—Stethogram repeated June 12, 1946, demonstrates the appearance of a presystolic murmur.

myocardial damage without valvular deformity. Care must be exercised, therefore, in making a diagnosis of mitral stenosis on the basis of a mitral diastolic murmur alone, since it may occur with either sickle cell or rheumatic heart disease and may not in either case represent a true valvular stenosis.

Laboratory studies are concerned primarily with demonstrating the presence of sicklemia. This can be accomplished without difficulty by merely observing the red cells in the counting chamber after shaking the pipette for ten minutes. If a patient has severe symptoms from his disease, it is usually not necessary to use special techniques to bring out the sickling nor make an exhaustive search for sickle cells. The procedure is done during a routine blood count and has proved to be a practical aid. Leucocytosis, another finding common to both diseases, may be misleading. Perhaps because we see milder rheumatics in California, leucocytosis has actually been present with greater regularity in our sickle cell anemias. Reticulocytosis is expected with the latter conditions. The sedimentation rate is of interest because an increased rate is usually considered to be the most constant of all laboratory tests for active rheumatic fever. If intravenous blood is drawn in the routine manner and the

sedimentation tube is filled without delay, thus not allowing much oxygenation, the sedimentation rate will be greatly decreased in the presence of sicklemia. This point was well demonstrated in 1944 by Winsor and Burch,[9] who showed that the blood in sickle cell anemia could be made to settle more rapidly after saturation with oxygen and to slow down markedly with carbon dioxide. The sedimentation rate is not so altered in patients with other diseases. This may be a useful short cut in diagnosis if a patient suspected of having rheumatic fever has an erythrocyte sedimentation rate of only 1 to 3 mm. per hour. The notable exception to this rule occurs during acute cardiac decompensation, which in itself lowers the sedimentation rate as the result of hemoconcentration.

Electrocardiographic findings show similarities in respect to increased P-R interval, but this is more frequent and perhaps more marked in sickle cell anemia. Roentgenograms are helpful in demonstrating the bone changes in sickle cell anemia as well as the size and configuration of the heart. As mentioned above, a diffusely enlarged cardiac silhouette is the rule with sickle cell hearts. Perhaps the best differential criterion is the mere presence of sickle cell anemia, which creates a presumption that the cardiac disorder is not rheumatic.

CONCLUSION

A case of sickle cell cardiopathy in a 12-year-old Negro girl is reported. The differentiation of this condition from rheumatic carditis depends on the failure of pain in the extremities to respond to salicylates, the finding of jaundice, lymphadenopathy, or an abnormal spleen, the demonstration of anemia, reticulocytosis and sickling of the red cells, a slow erythrocyte sedimentation rate, diffuse cardiac enlargement, a greatly prolonged P-R interval, and the characteristic bone changes associated with sickle cell anemia.

Rheumatic carditis appears to be extremely rare in patients with sickle cell anemia.

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FACTORS IN THE ETIOLOGY OF CONGENITAL HEART ANOMALIES

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AMONG the theories concerning the causation of congenital anomalies of the heart, the most widely accepted is that in the great majority of cases the proximate cause is arrest or imperfect development of the heart in early intrauterine life. The question of the primary cause remains unanswered. Possible causes are environmental factors that affect the growing embryo after fertilization has taken place, and intrinsic or inherited factors from either parent, due to defective germ plasm prior to fertilization. These factors will be separately discussed in the light of data obtained from the cases seen in the Infants' and Children's Hospitals of Boston.

ENVIRONMENTAL FACTORS

Disturbance of development occurring between the fifth and eighth weeks of intrauterine life, the period when the most rapid growth of the cardiac septa and the most complex rotation of the cardiac chambers take place, is the chief cause of the great majority of cardiac anomalies.[1] Maternal disease at this stage of pregnancy may be expected to play a major role in inducing such faulty development. In 1941, Gregg[2] published the first report of congenital anomalies in infants born of mothers who had contracted rubella in the early weeks of pregnancy. Since that time, several reports have appeared implicating one of the virus diseases in the first trimester of pregnancy. The literature on this subject has been reviewed and summarized by Albaugh[3] and Conte and his co-workers.[4] Certain questions, however, remain to be answered satisfactorily.

The first of these questions is as to the frequency with which maternal virus infections in early pregnancy are followed by offspring with congenital anomalies. Fox and Borton[5] have recently reported their observations with rubella complicating early pregnancy, showing that a considerable proportion of offspring escaped congenital anomaly. Nevertheless, we feel that, pending extensive observations to the contrary, it must still be considered that in the case of rubella, at least, infection in the early weeks of pregnancy carries a high likelihood of congenital anomaly as a sequel. Meanwhile, regarding virus and other exanthematous infections besides rubella, we have investigated the records of all women admitted to the South Department, or the contagious unit,‡ of the Boston City Hospital from 1936 through 1945, in an effort to determine the frequency with which these other conditions have been followed by anomalous offspring. All patients with virus and other exanthematous

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diseases were studied. Out of 1,387 women admitted with various virus and other exanthematous diseases, seventeen were pregnant, and of these only six were in the first four and one-half months of pregnancy. Our field of investigation has thus been so narrowed that we find it necessary to apologize for the brevity of this series of cases. The offspring of these six patients were followed. One mother had mumps in the second month of gestation, another had measles in the third month, and the other four had scarlet fever at one and one-half, two, two, and four and one-half months, respectively. Three of the mothers with scarlet fever had received sulfadiazine, in each case for five days, the dosage being 4 Gm. initially by mouth followed by 1 Gm. doses every four hours. In two of these cases the drug was withdrawn on the fifth day because of intolerance to it. The mother who had scarlet fever at four and one-half months gestation was exposed to measles and received gamma globulin because she was susceptible to the disease. Clinically, measles did not appear. In these six verified cases of maternal infection in early pregnancy, it is notable that none of the offspring developed a congenital anomaly except for a possible minor congenital obstruction of the lacrimal duct in the child of the mother who had measles in the third month. These findings are listed in Table I.

TABLE I. OFFSPRING OF MOTHERS WITH VIRUS AND OTHER EXANTHEMATOUS DISEASES IN EARLY PREGNANCY

CASE NAME	DISEASE OF MOTHER	REMARKS	MONTHS PREGNANT AT TIME OF DISEASE	BIRTH AT TERM (T) OR PREMATURE (P)	SEX RACE	BIRTH WEIGHT (LB.)	ABNORMALITIES IN OFFSPRING
1 L. A.	Mumps	Bilateral; submaxillary and left parotid glands	2	T	M Negro	7¼	None
2 C. M.	Rubeola	Mild	3	T	F White	8	Obstruction of right lacrimal duct
3 H. W.	Scarlatina	Treated with sulfadiazine for 5 days	1½	T	F White	6½	None
4 W. M.	Scarlatina	Also had bronchial asthma	2	T	F White	6½	None
5 J. M.	Scarlatina	Treated with sulfadiazine for 5 days	2	P (?)	M White	?	None
6 M. H.	Scarlatina; exposure to rubeola	Gamma globulin; sulfadiazine for 5 days	4½	T	F White	7¼	None

Another question is as to the frequency with which mothers of children with congenital heart anomaly give a history of infection or exposure to noxious agents in the course of pregnancy. In an attempt to answer this question, the records of all patients with congenital heart disease seen in the Infants' and Children's Hospitals during the decade from 1936 through 1945 were reviewed. The records of 434 patients were sufficiently detailed in this regard to allow reliable conclusions to be drawn. In nine of these cases, maternal virus infection was discovered, all in the first trimester of pregnancy (Table II). Moreover, all of these patients were observed during the last four

TABLE II. PATIENTS WITH CONGENITAL HEART ANOMALIES WITH HISTORY OF MATERNAL VIRUS DISEASES

CASE NAME	DISEASE IN MOTHER	MONTHS PREGNANT AT TIME OF DISEASE	BIRTH AT TERM (T) OR PREMATURE (P)	SEX RACE	ANOMALIES AND CRITERIA FOR DIAGNOSIS	CYANOSIS	OTHER CONGENITAL ANOMALIES
1 G. B.	Anterior poliomyelitis	2	T	M White	Heart enlarged; soft systolic murmur along left sternal line; x-ray showed large, rounded heart	Present	None
2 C. P.	Rubella	1	T (?)	F White	Tetralogy of Fallot (operation by Dr. Blalock)	Present	Bilateral cataract
3 E. K.*	Rubella	3	T	F White	Rough systolic murmur, maximum over precordium, best heard some distance away from heart; x-ray showed globular heart	Absent	Bilateral cataract
4 P. S.	Rubella	2½	T	M White	Harsh to-and-fro murmur in pulmonic area, with grade II murmur over apex, x-ray showed globular heart with broad base; interventricular septal defect	Absent	Congenital cataract of left eye; complete cleft of palate; malformation of right fourth rib; father had complete harelip and cleft palate
5 L. R.*	Rubella	1	T	F White	Typical patent ductus arteriosus (divided later by Dr. Gross); x-ray showed typical signs, ? interventricular septal defect	Absent	None
6 W. M.	Exposure to rubella (susceptible)	2	T	M White	Pulmonary stenosis; interventricular septal defect	Present	None
7 A. H.	Virus grippe	3	P	M White	Interventricular septal defect; x-ray showed enlarged heart; E.K.G. showed right axis deviation	Absent	None
8 L. C.	Virus grippe	2	T	F White	Large interventricular septal defect; x-ray showed enlarged heart	Present	Tracheoesophageal fistula
9 V. B.	Rubella	3	P	M White	E.K.G. showed right axis deviation; patent ductus arteriosus	Present	Bilateral cataract

*These were Dr. John Davies' private patients, treated in the Children's Hospital. Dr. Davies has observed three other such instances of congenital anomalies following pregnancy complicated with rubella. We are grateful for his permission to refer to these cases in this report.

years, possibly because in this period closer search has been made for any history of such infections.

The occurrence of anterior poliomyelitis in the second month of pregnancy followed by congenital anomaly in the offspring is, we believe, the first of its kind to be reported. A summary of this case follows:

G. B., a white, male infant, was the only child of a 19-year-old mother. A diagnosis of anterior poliomyelitis was made during the second month of pregnancy, and the mother was treated in an outside hospital. No residual paralysis remained. There was no other family history of congenital anomaly. The infant was born at full term with a normal delivery. The birth weight was 6 pounds 6 ounces (2.9 kg.). The patient was admitted at 9 days of age because of cyanotic spells since birth.

Physical examination showed a cyanotic, slightly jaundiced baby with moderate dyspnea. The conjunctival vessels were extremely prominent and engorged. The chest was asymmetrical, with prominence of the right side, where the breath sounds were louder than on the left. The heart was greatly enlarged on percussion, mostly to the left. A soft, systolic murmur could be heard irregularly along the left sternal border. The liver was palpable one fingerbreadth below the right costal margin, and the spleen could not be felt. The laboratory findings were within normal limits. Roentgenograms of the chest showed that the heart was greatly enlarged, full, and rounded in appearance, suggesting a severe type of congenital malformation, probably with a large interauricular septal defect. The electrocardiogram showed left axis deviation, –50 degrees, R_1 greater than R_2, and T_1 flat or depressed.

Review of the literature indicates that anterior poliomyelitis is by no means a rare complication of pregnancy,[6-8] yet since there have been no previous reports of congenital anomaly in the offspring of such pregnancies, in spite of widespread current interest in the subject, we feel that pending further evidence, the case just cited must be evaluated with caution.

In eight other cases the mother had a nonexanthematous bacterial infection during pregnancy. These cases are listed in Table III. The significance of such infection is uncertain. In addition to the mothers listed in the table, two had suffered from acute rheumatic fever and one from chorea during the first trimester, and their children were born with heart disease. In two cases of

TABLE III. PATIENTS WITH CONGENITAL HEART ANOMALIES WITH HISTORY OF MATERNAL BACTERIAL INFECTION

CASE SEX	DISEASE IN MOTHER	MONTHS PREGNANT AT TIME OF DISEASE	ANOMALY
1 F	Pneumonia	? early months	Congenital heart disease (no cyanosis)
2 F	Pyelitis	Early months	Dextrocardia (cyanotic)
3 F	Pyelitis	Early months	Congenital heart disease (no cyanosis)
4 F	Mild pyelitis	?	Congenital heart disease (no cyanosis)
5 F	Pyelitis	Early months	Congenital heart disease (cyanotic)
6 M	Strep. throat	First month	Congenital heart disease
7 M	Infected teeth	?	Cyanotic; great vessels transposed
8 M	Cystitis	Two months	Congenital heart disease; cyanotic and mentally retarded

congenital heart disease, the mother was found to be syphilitic. In one case the mother had had a severe ptomaine poisoning during the first month of pregnancy and was seriously ill for at least a week; her child was born with a probable Eisenmenger complex. Four mothers of children with congenital heart disease gave a history of allergic manifestations during the early part of pregnancy. One, an army nurse, had an appreciable degree of dermatitis on the hands during the first three months of pregnancy, probably an allergic manifestation due to the handling of emetine. Another suffered three attacks of hives during pregnancy, being allergic to lobster, pork, and cucumbers. Two other mothers had continuously suffered from attacks of asthma during pregnancy. The cause of allergy was not determined. In five patients severe trauma was present in the first trimester of pregnancy. In one case the mother developed thyrotoxicosis two months prior to conception, and during the second month of pregnancy a subtotal thyroidectomy was performed. The baby had a probable Lutembacher syndrome (interauricular septal defect with mitral stenosis). In still another case the mother was receiving thyroid extract for a low metabolic rate throughout pregnancy. In three cases the mother had been exposed to lead (while painting) during the early part of pregnancy.

INHERITED OR INTRINSIC FACTORS

The importance of heredity as a factor in congenital anomalies is undoubtedly great, but this is obscured by the propensity of such defects to cause early fetal death and resultant abortion. However, the frequency of other associated anomalies in other members of the family is indicative of the importance of heredity in congenital cardiac diseases. Among 720 patients with definite congenital cardiac anomalies, the records of 680 contained adequately detailed family histories. Of these 680 patients, sixty-seven (10 per cent) showed congenital heart defects or other anomalies in other members of the family. In twenty-seven patients (4 per cent) other siblings were involved, and in one, both identical twins had apparently similar cardiac anomalies. Various studies,[9, 10] although the statistics are not rigidly comparable, indicate that the incidence of congenital malformations in the general population is from less than 1 per cent to slightly more than 2 per cent. Among anomalies elsewhere in the body were the following: harelip and cleft palate, cerebral deficiency, imperforate anus, rectovaginal, rectoperineal, and tracheo-esophageal fistulas, malformation of digits, hydrocele, cataract, microphthalmia, micrognathia, microglossia, dwarfism, nephromegaly, Meckel's diverticulum, pyloric stenosis, accessory spleen, bilobed spleen, deformity of spine, ribs, and sternum, meningocele, congenital atresia of the bile ducts, accessory ear tabs, torticollis, and the Klippel-Feil syndrome. In forty-two patients with congenital cardiac defects (5.8 per cent), Mongolian idiocy was found to be an associated finding.

In considering other types of inherited abnormalities, the possibility of paternal exposure to industrial poisons must be included. Most of our information concerning the damage to the next generation that is caused by in-

dustrial poisoning has been drawn from the lead trades.[11] Statistics gathered by Hamilton[11, 12] show that an unusually large proportion of children of fathers exposed to lead are stillborn, but the evidence is not conclusive. Data in the European literature indicate that the incidence of miscarriages and stillbirths is excessively high in the wives of men working in lead industries.[11] Weller[13] has shown that male guinea pigs exposed to lead were not sterile but the young fathered by them were weak and underdeveloped. Their subsequent development was slow, and the number of deaths during the first week of life was high. We have made a practice of inquiring into the possibility of paternal lead exposure in all congenital cardiac cases in which information was obtainable.* In 645 of the present series of 720 cases the occupation of the father was mentioned, and, interestingly enough, in 61 cases (9.5 per cent) the occupation involved one of the hazardous lead trades, such as painting or working in battery plants. Trades only occasionally permitting the handling of lead in nondangerous physical forms are excluded.

With the help of the Massachusetts Department of Labor and Industries and the kindness of Dr. Harriet L. Hardy, a survey of the incidence of congenital anomalies in children of workers exposed to lead hazard will be carried out by one of the authors (H. G.).

SUMMARY AND CONCLUSIONS

The possible factors in the causation of the congenital anomalies of the heart are discussed.

It is shown that mumps, rubeola, and scarlet fever during early pregnancy do not constantly produce offspring with anomalies.

Of 434 patients with congenital heart disease, with detailed histories concerning the course of pregnancy, one gave a history of anterior poliomyelitis, five of rubella, one of exposure to rubella, two of grippe, two of rheumatic fever, one of chorea, two of syphilis, and eight of bacterial infection during the early months of pregnancy. In four patients there had been allergic manifestations, in one, severe ptomaine poisoning, in two, disturbances of thyroid gland, in three, exposure to lead, and in five, trauma. The vast majority of mothers had had an uneventful pregnancy. It thus appears that disease and the presence of noxious agents during pregnancy could possibly account for only a small proportion of cases with anomalies, and further investigation, to which it is hoped the present report may make a small contribution, is necessary to explain the etiology of these conditions.

The importance of heredity in the etiology of congenital cardiac diseases is considered and the family histories of 680 cases are summarized with reference to the occurrence of anomalies in other members of the family.

The high incidence of paternal lead exposure was considered impressive and will be the subject of further investigation.

*The original suggestion for this inquiry had come from Dr. Paul W. Emerson.

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DACRYOSTENOSIS

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MOST pediatricians have been called upon, at one time or another, to prescribe for the baby whose tears overflow the conjunctival sac. There is a school of ophthalmology which claims that these patients should be treated by operation. We have observed a series of about 200 infants in which the natural history of the condition would indicate that such radical measures are rarely necessary.

This condition is called epiphora, an overloading of the conjunctival sac with tears. The term dacryostenosis is coming into more common usage because of the usual embryologic explanation.

The first appearance of the anlage of the nasolacrimal duct is in the 12 mm. embryo. There is a ridgelike thickening of the epithelial lining of the nasolacrimal groove which extends from the inner angle of the orbital fossa to the primitive olfactory fossa. The ridge becomes cut off from the surrounding epithelium, and sinks as a cord into the underlying mesoderm. Subsequently, due to differences in growth, this cord may be separated from the ectoderm of the nasal cavity and later join up again. As the eyelids form, the cord is found passing medially from the inner canthus, then down to the nasal fossa. It may have gaps in it. Canalization begins at about the 50 mm. stage and normally is completed before birth. One of the last changes in the fetus before birth is the final degeneration of the center of this cord where it opens into the nostril below the lower turbinate under a fold of mucous membrane known as the valve of Hasner. For this reason, delay in opening is one of the common anomalies seen after birth.

During the first few weeks of life there is little secretion of tears. When they do appear, they do not drain away as rapidly in dacryostenosis as in the normal condition. The mother complains that one or both of the baby's eyes tends to water. She is more likely to complain if the condition is unilateral, because then she has a means of comparison.

If the lacrimal sac is irrigated at this stage with a Ewing syringe, considerable epithelial debris and/or a mucous plug may be dislodged. This has led observers to believe that many cases of obstruction are due to accumulation of the products of degeneration. A further corroboration is the fact that many of these cases clear up spontaneously with no treatment whatsoever. This usually occurs during a good cry, when there is a copious supply of tears and much blinking, with compression of the lacrimal sac by the forceful closure of the eyelids, such as during attempted examination of the eyes of the small baby in the doctor's office.

To what extent 2 per cent silver nitrate instilled into the eyes of the newborn is a factor in this condition is an open question. There is no doubt as to its

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efficacy in reducing ophthalmia neonatorum, which is still the greatest cause of blindness. For this reason its use must not be challenged until something better is proved. Anyone who has had it instilled in an eye in later life knows how much it stings. Those who work in maternity ward nurseries are familiar with the chemical conjunctivitis which it causes. The law in Alberta permits the use of fresh, 40 per cent Argyrol instead, but it is not nearly so efficacious and is largely being discarded. Last spring the pediatricians in Toronto persuaded the Ontario government to permit the use of penicillin. Dr. E. A. Morgan tells me that not only has the chemical conjunctivitis disappeared, but that it is his impression that there is a great reduction in the number of cases of epiphora seen.

Some writers have stressed the importance of stenosis along the course of the canal, presumably at the sites where the continuity was broken during fetal life, as at the nasal end and at the entrance and exit of the lacrimal sac. Stenosis facilitates the accumulation of debris. Frequently, in irrigation, the continuity is established at the first attempt and the epiphora disappears.

But not all cases clear up so easily. The condition may persist for many months as if the process of canalization were delayed, in which case the infant may continue to have a membrane over the lower end of the canal. This prevents proper drainage and causes further accumulation of debris, and secondary infection with organisms of low virulence or invasion with leucocytes may result. Such infants are brought to the office with the complaint that the eyes are sticky, especially on awakening in the morning. In these cases the purulent material has formed in sufficient quantities to back up into the conjunctival sac during sleep and evaporate on the lid margins. It may be necessary to bathe the eye before the baby can open it. There is little or no redness or swelling, because the walls of the canal have not been invaded by an inflammatory process. After the eye is bathed, a small drop of pus can sometimes be expressed by pressure on the lacrimal sac.

It is concerning this group of cases that there has been a divergence of opinion as to the correct procedure. The ophthalmic surgeons have insisted, with good argument, that probing, and hence breaking through a persistent membrane or dilating a stenosis, is the method of choice. Others have maintained that more conservative methods of treatment give satisfactory results in the vast majority of cases. Since this difference of opinion was first drawn to my attention I have been interested in following the results of conservative treatment. Certainly the number of cases referred for probing has been greatly reduced. Because most of the literature on the subject is written by ophthalmologists whose patients undoubtedly require operative interference, we have kept under observation a series of pediatric patients with this complaint, to determine the natural history of the condition.

The conservative treatment consists of keeping the eye clean with boracic solution (in some cases using an antiseptic in the conjunctival sac) and pressure over the lacrimal sac. Irrigating the conjunctival sac of the small baby cannot be done efficiently by the mother, and about all that it accomplishes is cleanliness of the eyelids and an improved appearance.

Silver solutions are contraindicated because of the danger of argyria. Parents should be warned against using such preparations as argyrol, because they are tempted to continue the treatment indefinitely in a condition which may be chronic. They get a false sense of security with antiseptic eye drops because when they are discontinued, the formation of pus seems to recur, probably due to an increase in growth of the organisms that invade the stagnant fluid.

The crux of the conservative treatment lies in the pressure over the lacrimal sac. This is applied firmly with the washed fingertip, with a rocking motion from above downward at the inner canthus in an attempt to expel the contents of the sac down the nasolacrimal duct into the nose. Since the baby usually expresses objection to such close proximity to his eyes by crying, there is a copious supply of tears. The process is repeated by the mother for about a minute two or three times a day. It is the same principle as the rubber bulb pump. The theory is that this measure stimulates the flow down the nasolacrimal duct in a forceful manner, keeping it clear of debris, and stimulates its development as a drainage tract. Ophthalmologists have assured me that it is quite possible with one forceful expulsion to rupture a persistent membrane at the valve of Hasner. Some writers urge repeated office irrigation of the duct with normal saline, but in a busy pediatric practice this has not been feasible, and it has been my observation that ophthalmologists to whom these cases have been referred have preferred to probe and dilate the duct rather than to drag out the treatment in such a time-consuming manner.

When a true dacryocystitis develops, it is a case for the ophthalmologist. I have only one such case on record. It is my impression that I have seen several others that were not under treatment by our department. They were forwarded at once to the ophthalmologist without starting a record. The treatment is adequate drainage by probing or by incision and drainage of the lacrimal sac. The drain in such an incision must not be left in too long a time as it predisposes to a lacrimal fistula. This is an argument for drainage by probing. Heat is applied as warm compresses. Recently, chemotherapy has taken an important place in the treatment of this condition. There is growing a school of thought which claims that the infection should be overcome by chemotherapy before dilatation by probing is undertaken.

Eliminating the one case of dacryocystitis, we have followed up 203 patients with dacryostenosis. Eleven of these (5.4 per cent) have been treated by probing. In comparing this with Hardesty's series of sixty patients in which 66 per cent required probing, we must bear in mind the difference between a pediatric practice in which the mother brings every little complaint to the doctor and an ophthalmic practice with many referred cases.

Of the total 203 patients with dacryostenosis, thirty-four were seen before conservative treatment became routine in our pediatric department, and 169 were seen since. Of the eleven patients treated by probing, six (17.6 per cent of the thirty-four) occurred in the former series, and five (2.9 per cent of 169) occurred in the latter.

In the series of thirty-four patients in the first period, seven were referred to an ophthalmologist. As stated above, six had the ducts dilated by probing under anesthesia. The seventh recovered while the family was considering the ophthalmologist's advice to operate. This patient and two others recovered while receiving only mild antiseptics in the eyes. Four recovered without any treatment and four recovered while receiving local antiseptics and massage. The remaining seventeen recovered with only massage of the inner canthus.

Of the six patients treated by probing in the first series, three might easily have responded to conservative treatment if it had been tried. They were 4, 7, and 10 months of age. The fourth was a 10-year-old boy. The fifth patient required probing twice. The sixth was an 8-month-old baby whose parents insisted on something definite being done at once.

Of the five treated by probing in the second series of 169, one patient required dilatation twice. Two were referred to an ophthalmologist when first seen by a new associate who was unfamiliar with the routine, and promptly received dilatation. One patient was referred and probed one month after being placed on conservative treatment at 4 months of age by the same associate, but I am unable to determine how conscientiously the treatment was carried out. The fifth case was a boy of 8 months who was not placed on conservative treatment but who required a circumcision. Advantage was taken of the anesthetic to dilate his duct.

Thus, in the whole series of 203 patients there were only three with positive indications for operative interference.

Of the 192 patients whose conditions cleared up without operative interference 149 (77.6 per cent) had recovered by three months of age, twenty-six (13.5 per cent) recovered by 6 months of age, twelve more cases (6.3 per cent) recovered by one year and the remaining five (2.6 per cent) cleared up during the second year. From this it would appear that nature takes care of most of these cases of delayed development.

CONCLUSION

Cases of simple dacryostenosis can be treated conservatively with success by the pediatrician until well after the first year. Cases of dacryocystitis should be referred at once to the ophthalmologist for treatment.

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INTESTINAL OBSTRUCTION OF THE NEWBORN

A Report of Five Patients Successfully Relieved by Surgery

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INTESTINAL obstruction of the newborn may be caused by atresia of the bowel, which signifies complete obliteration of the lumen, or stenosis, which signifies incomplete obliteration of the lumen. The bowel may also be compressed from without. This is extrinsic obstruction. Our patients are three with atresia and two with extrinsic obstruction.

A few brief sentences will adequately describe the symptoms and signs observed in these five newborn infants with intestinal obstruction. The generalizations deducted from them are greatly strengthened by the fact that these observations largely coincide with those made by Ladd[1] on a much larger series.

The diagnosis rests largely on two important symptoms. The first is vomiting, which is unlike ordinary vomiting of the newborn. It begins early, usually the first day of life. It is frequent, copious, persistent, bile stained, and usually nonprojectile.

The pediatrician is likely to see the bile-stained vomitus in the basinet. The vomitus is more likely to roll out than to shoot out. One is at once struck with the fact that this is no ordinary vomiting of the newborn. The nurse offers the information that the baby began to vomit soon after birth. The bile in the vomitus attracts attention. The obstruction is seldom proximal to the ampulla of Vater. This occurred only once in Ladd's entire series of fifty-two patients with congenital atresia of the bowel.

The second cardinal symptom is distention of the abdomen. It may be distended at birth, but usually is not until after birth, and distention may be so slight that it scarcely attracts attention, or it may be enormous. The amount of the distention depends, at least in part, on the location of the lesion; the lower the lesion the greater the distention. Visible, deep, peristaltic waves, when present, are pathognomonic of obstruction. They were a prominent feature in our patients with atresia except the one with perforation. They were lacking or inconspicuous in the two patients with extrinsic obstruction. In depth, these waves resemble those of pyloric stenosis. They may be in any portion of the abdomen. Hypertrophy and distention above the point of atresia are so great that the location of the distended loops is not a reliable guide to the anatomic site of the obstruction.

Roentgenograms are helpful, but the barium sulfate meal is usually not necessary to establish diagnosis. It is dangerous and causes considerable delay when time is very valuable. It is an added insult to a gastrointestinal tract which is already badly out of adjustment. Moreover, the flat film usu-

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ally yields the desired information. If the lesion is atresia and is high in the gastrointestinal tract, both the stomach and upper bowel may appear as huge gas bubbles, as in Case 3. If atresia is lower in the bowel, numerous gas distended loops are likely to cover the film, as in Case 2. If the obstruction is not complete, gas will be distributed throughout the tract, as in Cases 1 and 5.

The time element is of paramount importance. The consultant seldom sees these babies before the third day, while ordinarily they must be operated on by the fourth day if the issue is to be successful. Diagnosis must be made promptly. The pediatrician should secure the services of a surgeon who is skilled in infant surgery.

Fig. 1.—Case 1. Photograph of 5 cm. enteric cyst with resected portion of the jejunum laid open. Note that it is closely bound to the cyst.

CASE REPORTS

Case 1.—Baby P. was a full-term male infant born in the Ingalls Memorial Hospital, Harvey, Ill. on Nov. 14, 1943. Consultation was requested on the third day of life, when he appeared normal except for dehydration from almost continuous vomiting of a thin, light green fluid. Vomiting was not projectile. He lost one pound, one ounce in the first three days of life. On the fourth day he was transferred to St. Luke's Hospital, Chicago, and improved with supporting measures. Besides meconium he passed a little bile-stained mucus. This led to a diagnosis of stenosis rather than atresia. We temporized, hoping for improvement. Delay was a serious error. Peristalsis became prominent, the abdomen distended, and the baby's condition grew worse. A barium sulfate meal was given on the seventh day with inconclusive results, and repeated on the eighth day. Obstruction was reported and operation was performed on that day.

A firm, globular, enteric cyst, 5 cm. in diameter, lay in the left upper quadrant (Fig. 1). The cyst wall contained all layers of the small bowel but it did not communicate with the lumen of the bowel. The proximal jejunum, before rising over this cyst, was folded on itself beneath it. This almost completely obliterated the lumen. Apparently, nothing had passed this point except the bile-stained mucus. Struggling against this obstruction, the jejunum had completely severed itself into two portions. The barium must have added materially to the shearing action of peristalsis in severing the bowel. The distal, severed end of the jejunum was closely bound to the cyst; the proximal end lay loose in the abdomen, which was filled with bowel content and barium sulfate. A side-to-side anastomosis was made and the abdomen closed.

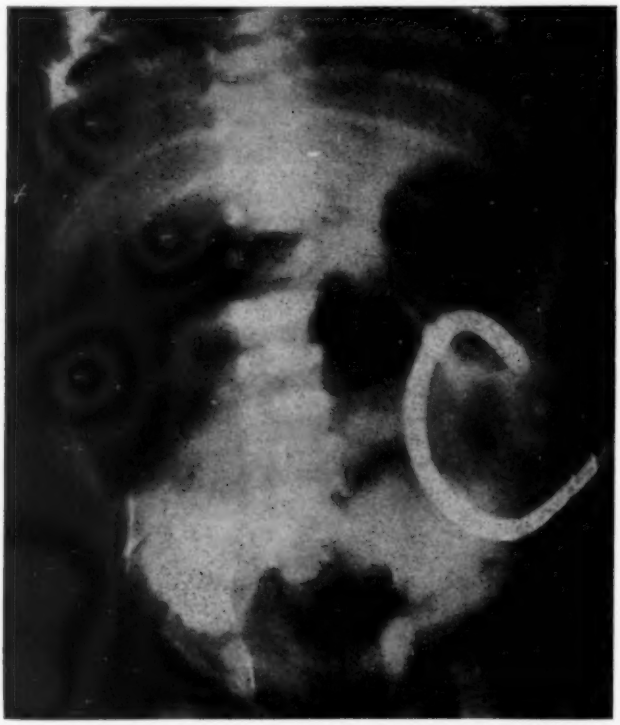

Fig. 2.—Case 2. Roentgen-ray film of the abdomen soon after birth, showing marked distention. The gas-distended loops which largely fill the entire abdomen were of the upper gastrointestinal tract.

The postoperative condition was very poor and grew even worse. We ordered 2½ grains of sulfadiazine to be given subcutaneously. By error, 2.5 Gm. or 37 grains were injected. Severe nephritis followed, characterized by generalized edema with a large number of red cells and casts in the urine. In addition to this catastrophe the wound suppurated and opened widely. The baby almost eviscerated. After the baby's survival of these events, matters gradually improved. The edema disappeared two weeks after the onset of nephritis and the urine returned to normal after an additional two weeks. The baby left the hospital six weeks after operation, weighing 3 ounces less than at birth.

At the age of one year he returned to the hospital for observation. A complete x-ray study of the gastrointestinal tract with barium sulfate revealed no abnormality. He was normal except for some deformity of his belly wall.

CASE 2.—Baby S. was a full-term male infant born at St. Francis Hospital, Blue Island, Ill. at 4:30 P.M., July 13, 1944, and was first seen by us sixty-eight hours after birth. Three hours after birth he began vomiting a copious amount of bile-stained fluid. The abdomen was greatly distended at birth (Fig. 2). This was noticed in the delivery room. Four large loops of bowel were observed in vigorous peristalsis. The diagnosis was obstruction of the bowel, probably atresia. We advised against giving barium sulfate. The baby was operated upon three hours later or seventy-one hours after birth.

Fig. 3.—Case 2. Resected portion of ileum. Note rounded end (a) without an attached cord. Note also smooth, unattached edges of mesentery of the proximal defect (b) and the smaller distal defect (c) through which the herniation occurred.

At a point about 30 cm. below the ligament of Treitz the ileum ended in a blind, rounded end. Above this point, the bowel was enormously dilated and markedly hypertrophied to 35 or 40 mm. in diameter. The distended gut largely filled the abdomen. Distally, the ileum and colon were collapsed. They contained a light green, inspissated meconium which did not pass until after operation. The ileum here measured 7 to 9 mm. in diameter and began with a rounded end. There was no connection between the two portions, not even a chord. In addition to this deformity there were two large defects in the mesentery (Fig. 3). A narrow, fibrous band representing mesentery lay between the two defects, and another narrow, fibrous band connected the proximal tip of the distal portion of ileum to the root of the mesentery, thus representing another segment of mesentery. Neither of these mesenteric rudiments contained pulsating vessels. Through the distal and smaller mesenteric defect the terminal ileum, cecum, and ascending colon had herniated from anterior to posterior. There was impending perforation in the portion of the ileum corresponding to the middle of the lower mesenteric defect. This was probably due to the tension of the herniation.

The hernia was reduced, and the bowel divided at the site of the impending perforation. The segment of bowel between this point and the point of atresia was resected by simple ligation of the two bands of rudimentary mesentery and a side-to-side anastomosis

was accomplished. A catheter was placed in the bowel by the Witzel method above the anastomosis and brought out of the upper angle of the wound, which was closed in layers. The resected bowel measured 118 cm. (Fig. 3). This was estimated to be about one-half of the small bowel present.

Fig. 4.—Case 2. Photograph of autopsy specimen showing ostomy between the upper and lower portions of the ileum. Note marked contrast in size even after some equalization.

Postoperative Course.—Meconium passed per ano on the fourth day. The catheter was removed on the sixth day. The fistula closed spontaneously on the fourteenth day. The baby developed a celiac-like syndrome, taking an unusually large amount of food and discharging frequent thin, foul-smelling stools containing fat. For a time the baby gained slowly, attaining a maximum weight of 6 oz. above birth weight. Lung infections were frequent, suggesting pancreatic disease. On the eighty-third day of life the baby was transferred to St. Luke's Hospital, Chicago. A barium sulfate meal showed a lagging at the site of anastomosis. The baby had adequate stools, however, as indicated by the fact that the abdomen from this time on diminished in size adjusting toward the normal proportions. Fat disappeared from the stools and abdominal distention became less. Nevertheless, the baby continued to lose weight and died on the one hundred twelfth day of life with signs of terminal lung infection, weighing 6 oz. less than at birth.

Autopsy.—Death was due to inanition and terminal bronchopneumonia. The diameter of the bowel below the ostomy had doubled, measuring 15 mm.; that above had decreased about one third, measuring 30 mm. except for a pouch just proximal to the ostomy. Thus the two diameters seemed to be equalizing themselves (Fig. 4). The entire remaining small bowel measured 210 cm. This is much greater than the estimated length at the time of operation. The pancreas was essentially normal.

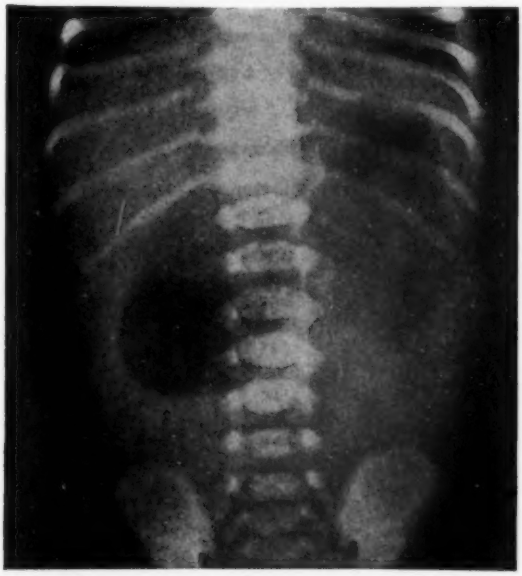

Fig. 5.—Case 3. Roentgen-ray film of abdomen before operation. Note two large gas bubbles largely filling the abdomen. One represents the stomach; the other, the duodenum.

CASE 3.—Baby B. was a full-term male infant born at the Roseland Community Hospital, Chicago, July 4, 1944. He was seen in consultation thirty-four hours later. The presenting symptom was vomiting. It was frequent and persistent, occurring every few minutes, and began a few hours after birth. The vomitus was bile stained. The baby was dehydrated, and in three days lost 1 lb., 6 oz. He passed large amounts of meconium. For this reason the attending physician was reluctant to accept the consultant's diagnosis of obstruction. Deep peristaltic waves were observed progressing downward into the left lower quadrant. We made a diagnosis of obstruction, probably atresia, located high in the small bowel and advised immediate operation. Circumstances did not permit operation until twenty-four hours later. In the interim, a flat film disclosed two large, confluent air bubbles of the abdomen (Fig. 5). These were of about equal size and were correctly interpreted by the roentgenologist to represent the stomach and duodenum. After passing a catheter into the stomach, they disappeared. A subsequent film revealed no air at all in the abdomen, sealing the diagnosis of atresia of the bowel (Fig. 6).

At operation, the duodenum presented itself equal in size to the stomach. The pylorus could not be identified. The obstruction was located in the third portion of the duodenum near the ligament of Treitz; it was not dissected out. An anastomosis between the duodenum and jejunum was made. Postoperative course was stormy. The baby left the hospital after four weeks, having regained his birth weight.

At the age of 4 months the infant appeared to be perfectly normal. A complete gastrointestinal x-ray study at this time revealed that the duodenum had not completely

returned to normal size but was approximating it. A barium and milk mixture had not completely passed from the stomach at the end of three and a half hours, but it did pass from the stomach before the end of five hours. The infant stomach should empty itself of a barium and milk mixture within three hours. Prior to 4 months of age, this child's gastrointestinal tract had become adequate for his physiologic needs. However, anatomically it had not completely readjusted itself.

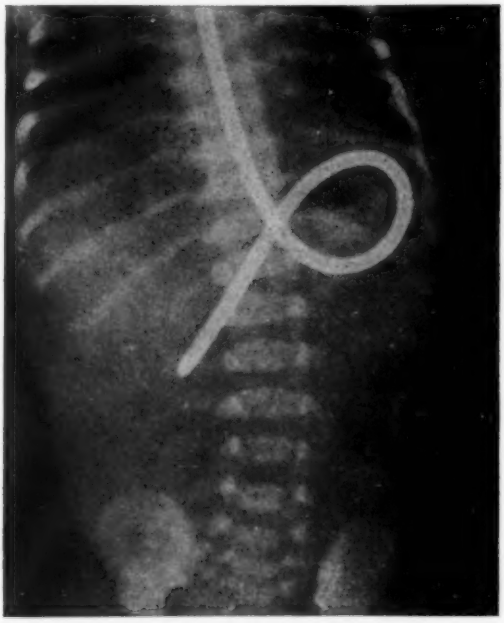

Fig. 6.—Case 3. Roentgen-ray film after escape of gas from stomach and duodenum. Note there is no gas in the entire gastrointestinal tract.

CASE 4.—Baby Mi. was a full-term infant, born Aug. 12, 1945, at St. Luke's Hospital, Chicago. The pediatric resident was called thirty hours after birth on account of persistent vomiting and marked abdominal distention. Visible peristalsis was absent and the abdomen was silent. Dr. S. C. Henn made a diagnosis of bowel obstruction with peritonitis thirty-eight hours after birth. Eight hours later celiotomy was performed. The abdomen was filled with air and meconium. The small bowel was adherent to the anterior abdominal wall, where there were two perforations. Adhesions were fibrous, necessitating sharp dissection from the anterior peritoneum, liver, stomach, and gall bladder. This process had evidently been going on in utero for a considerable time. After the bowel was freed, the mechanism could be identified, and was found to consist of a cord atresia of the ileum, 3 cm. above the iliocecal junction, and a defect in the mesentery through which the terminal ileum had herniated. It had then rotated counterclockwise, having made two complete turns. There was a third perforation, this one of the terminal portion of the ileum. Here the ileum was firmly bound to the posterior peritoneum, which was also perforated, and the retroperitoneal space was filled with meconium. The serosa of all of the involved bowel was dull. There were numerous areas of threatened perforation. This damaged portion of the bowel (Fig. 7), when resected, measured 53 cm. A side-to-side ileocecostomy was performed. Toilet of the abdominal cavity and retroperitoneal space was done by aspiration. The abdominal wall was closed in layers with interrupted, chromic

catgut and silk. Cultures showed a light growth of colon bacilli at the end of twenty-four hours. Penicillin was administered postoperatively. The wound healed by primary union.

Postoperative Course.—The bowels moved on the fourth day. Water was given by mouth for the first time on the third day, and formula on the fourth. Weight on the fourth day was 8 pounds, 5 ounces. The abdomen began to distend during the second week postoperatively and the stools became frequent and fatty. By the fifth week, the weight was 9 pounds, 1 ounce. At this time the baby became acutely ill, the temperature rising to 102° F. The stools became watery and frequent, up to twenty a day. Stool cultures revealed organisms of the salmonella group. Sulfaguanidine and penicillin were administered. The temperature returned to normal and the stools became much less frequent,

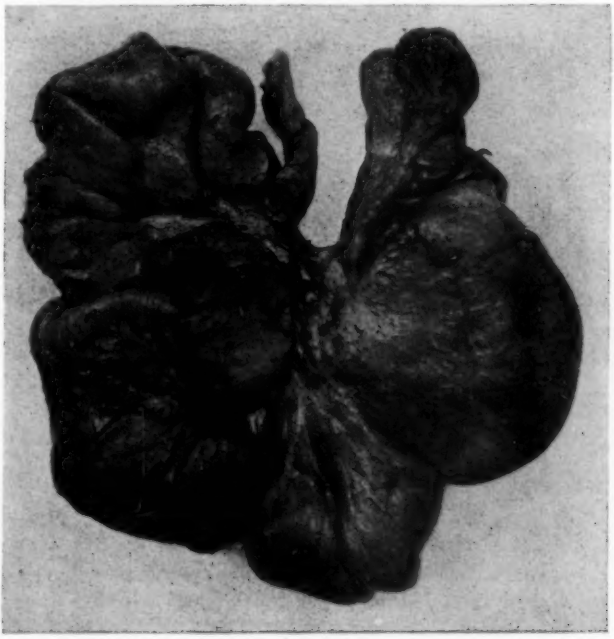

Fig. 7.—Case 4. Resected portion of ileum. Note hypertrophy and distention.

averaging three or four a day, but the weight continued downward to 7 pounds by the ninth week of life (Fig. 8). Although death seemed inevitable, we started the baby on a concentrated pancreatic extract, 0.5 Gm. three times daily. The weight increased, stools became more normal, and the abdominal distention receded. He began to take note of his surroundings. His vigor greatly improved. When 108 days old, the baby weighed 10 pounds, 7 ounces, and appeared to be on the way to recovery. At this time, an epidemic of upper respiratory virus infection broke out on the children's floor. This baby, the second one of five to die, began to cough on the one hundred twelfth day of life. The temperature rose to 104° F., the abdomen again became distended, and the baby died on the one hundred fifteenth day of life.

Necropsy.—Cause of death was bronchopneumonia and inanition. There were passive congestion and bronchopneumonia of the lower lobes of both lungs, moderate fatty change of the liver, distention of the stomach, ileum, and the colon, and a well-healed ileocolostomy measuring 12 cm. in diameter (Fig. 9). The small bowel from the ligamentum of Treitz to the ileocolostomy measured 220 cm. There was no obstruction of the gastrointestinal tract. The pancreas was normal.

CASE 5.—Baby Ma., a Negro male infant weighing eight pounds, eight ounces, was born by cesarean section of a diabetic mother at St. Luke's Hospital, Chicago, and transferred to the pediatric service 7:30 P.M., April 18, 1946, forty-three hours after birth, on account of frequent vomiting. The vomitus was bile stained. The baby had not retained a feeding since birth. It had passed nothing but meconium and a little blood-tinged mucus per ano.

Fig. 8.—Case 4. Photograph of baby at lowest ebb. Note celiac-like appearance.

The abdomen was greatly distended and bowel sounds were present. Visible peristalsis was not present. A barium enema on admission to pediatrics revealed that the lower bowel was patent up to the cecum. Absence of large gas bubbles on a flat plate spoke against atresia. Gas distributed through both the large and small bowel also spoke against complete obstruction. A thin barium mixture given per os the next morning showed that the obstruction was not complete, but the baby continued to distend and retained nothing by mouth. The infant had been receiving subcutaneous fluids. After surgical consultation with Dr. Foster McMillan, operation was planned while the patient was still in good condition. The operation was performed seventy-three hours after birth.

A greatly distended hyperemic ileum without inflammatory signs bulged from the incision. It was four times the normal size. The colon had largely rotated, but descent

was incomplete. The caput coli lay at the level of the umbilicus, angulated laterally at a 90° angle, and was bound by a fibrous band. This and other fibrous strands to the posterior abdominal wall constricted the head of the cecum and the terminal ileum enough to cause almost complete obstruction. When the bowel was freed the ileum decompressed itself into the cecum, which was then brought into normal position and fixed.

Postoperative Course.—During the first, second, and third day, the baby progressed well without abdominal distention or regurgitation. Food was retained and the bowels moved. On the fourth day signs of skin infection about the wound as well as on other parts of the body appeared. The wound suppurated and the skin sutures sloughed out. The wound was supported by adhesive bridges.

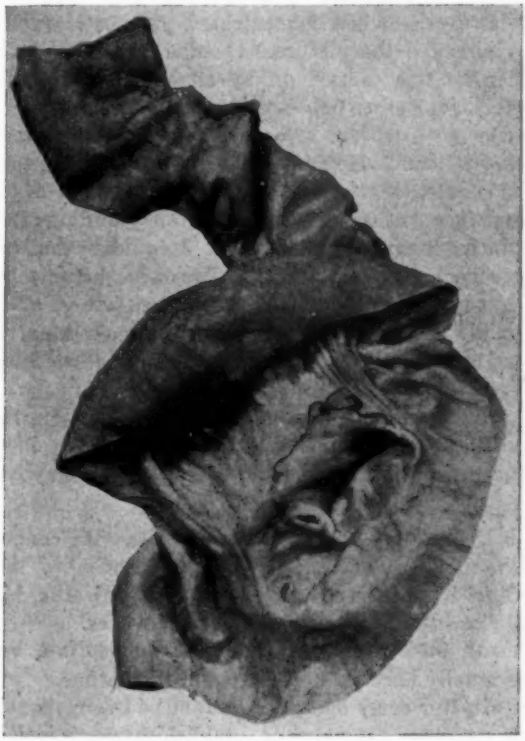

Fig. 9.—Case 4. Autopsy specimen showing ostomy between ileum and cecum.

The baby gained ground slowly. He retained most of his feedings but regurgitated some each day. The day before operation he weighed 8 pounds, 4 ounces. Ten days later he weighed 7 pounds, 13 ounces. At the end of four weeks he had regained his birth weight. During the subsequent five weeks he gained another pound. At this time he stopped regurgitating, began to gain rapidly, and was discharged ten weeks after birth, weighing 9 pounds, 10 ounces. By this time the wound was completely healed. Penicillin was the chief anti-infection drug used.

SUMMARY

We have presented the salient features of five cases of intestinal obstruction of the newborn, three of atresia and two of extrinsic obstruction. Two

cases of demonstrated atresia had other defects which necessitated the resection of large portions of the ileum, 118 cm. in Case 2 and 55 cm. in Case 4.

These two cases deserve special consideration. Each patient survived the immediate effect of the operation but developed a celiac-like syndrome. Case 2, having lost 118 cm. of small bowel, developed a greatly distended abdomen and passed fatty stools for several weeks. Later, the stools lost their fat and the abdomen adjusted toward the normal. Nevertheless the baby died of inanition on the one hundred twelfth day of life. The same syndrome developed in Case 4 after resection of 55 cm. of ileum. The baby appeared to be approaching its demise when concentrated pancreatin, well diluted in the formula, rapidly changed the picture. He then appeared to be on the road to recovery, when he was carried off by an epidemic of severe respiratory infection which took four other babies in the same nursery.

Arnheim[2] reported a patient who developed a similar syndrome after resection of 23 cm. of ileum. He found pancreatin helpful in a successful but long drawn out struggle.

These clinical facts, coupled with the autopsy findings in Cases 2 and 4 and the postoperative x-ray findings in Case 3, indicate that the young bowel has a remarkable compensatory ability. The large lumen above the atresia and the small lumen below tend to equalize each other, and the shortened bowel grows rapidly in length. Linear growth is a normal function of the infant bowel, and apparently the rate of growth is accelerated in the shortened bowel.

It is suggested, therefore, in cases of massive resection, that every effort be made to keep these babies alive until the compensatory factors accomplish their goal. Pancreatin is a material aid. We wish to emphasize the following facts:

1. The pediatrician does not usually see babies with congenital bowel obstruction until the third day of life.
2. The cardinal symptoms are persistent, nonprojectile, bile-stained vomiting, abdominal distention, and visible peristaltic waves.
3. Roentgen-ray films are helpful, but barium sulfate by mouth is unnecessary. It is usually harmful and wastes precious time.
4. The necessity for early operation cannot be overemphasized.
5. Ladd demonstrated the value of establishing continuity of the lumen by side-to-side anastomosis.

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GENERAL ANESTHESIA IN THE DIFFICULT PEDODONTIC PATIENT

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CHICAGO, ILL.

THE purpose of this work is to develop a technique of anesthesia which would make possible the accomplishment of extensive dental operations for children without physical pain or psychic trauma. The dental profession has been engrossed primarily with the mechanics of its work to the extent that the psychic effects of dental treatment have been largely overlooked. With some children this condition has produced unfortunate results. Almost without exception a child who requires early dental attention will be a dental patient all of his life. As a young adult it becomes his prerogative and his responsibility to seek regular dental care. Whether or not he does so will depend to a large extent upon the attitudes he has developed during his childhood experience. It is a part of our professional responsibility to society to make the relationship between the profession and society as pleasant as possible.

The advancement in surgery has been correlated with the progress in the science of anesthesia. The immediate problem in successfully managing difficult child patients is to find some technique of anesthesia which would permit the dental operator to work carefully and successfully in the mouth. The psychic trauma would be reduced to a minimum, and the operator could devote his whole attention to the treatment. He could accomplish work of a nature impossible on a conscious patient, and could do an amount of work at one time which would ordinarily require many visits to a dental office.

It is important to avoid frightening a child, who, after 2 years of age, will carry the unpleasant experience and fear to later life.[1] Children under 5 years of age are too young to understand explanation, and it is desirable to have sufficient sedation to produce amnesia and reduce strain and fatigue for the period immediately preceding operative manipulations. In certain terror-struck and excited children, a basal narcosis by the oral or rectal route while the patient is in his own room avoids commotion and disturbance enroute to the operating room.

Differences of resistance to anesthesia are largely differences in metabolic state.[2] The level of metabolic rate represents the degree of reflex irritability and oxygen demand. Metabolic levels are higher in children between the ages of 2 and 12 than at any other time in the life cycle (Chart 1). During this period, the pain thresholds are lowered and the addition of apprehension and fear increases the metabolic rate. Sedation by drugs is effective in increasing the threshold to pain and lowering the metabolism by allaying excitement, thus reducing the amount of oxygen required, and the period of restlessness and

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excitement which frequently accompanies the return to consciousness from anesthesia can be largely circumvented.

Basal anesthesia is a light degree of anesthesia obtained by giving sufficient preliminary medication. It allows the patient to be brought to the operating room in an unconscious state, yet not sufficiently depressed for surgical procedure. In general, none of the nonvolatile agents should be used to depress the patient beyond basal narcosis into complete surgical anesthesia. Local anesthesia might be used as an adjuvant, or a final leveling off to the necessary depression can be conducted by one of the volatile or gaseous agents.[3] Tribromethanol in amylene hydrate (Avertin) has prevailed over other hypnotics as a basal agent. The barbiturates possess some advantages as central nervous system depressants; any degree of depression from slightest sedation to urgical anesthesia can be obtained by selection of drug, dose, and route of administration, and they have the unique property of affording protection against the toxic effects of local anesthetics.

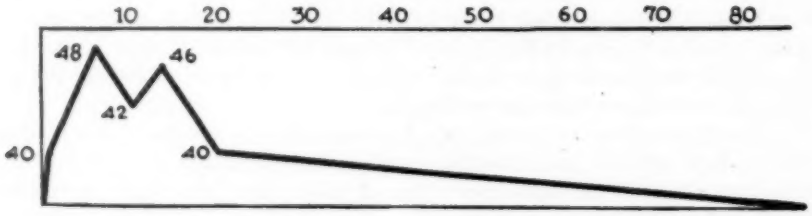

Chart 1.—Curve of normal metabolic rate through life, estimated in calories per hour per square meter of body surface. The curve of oxygen demand and reflex irritability was parallel.

METHOD

Two kinds of patients were selected for the work to be done: children who would not cooperate while in a conscious state; and those small children whose mouths were extensively in poor condition, necessitating painful procedures and repeated visits to the dentist's office. Forty-two children were studied for this report. Nineteen were male. The age range was from 2 to 13 years. The physical state was good in all cases, the entire group being placed in Group I, in accordance with the American Anesthesia Society standard of risking patients.

Group I.—Tribromethanol (avertin) was the basal agent chosen in eleven cases. Avertin fluid, 120 mg. per kilogram of body weight, was prepared as a 2½ per cent solution in distilled water, and 60 mg. of the total dose were instilled rectally in the patient's room thirty minutes before the scheduled surgery time. Every five minutes, 10 mg. doses were added until unconsciousness was obtained. Thus, the phlegmatic or hypothyroid type of patient needed only 60 or 70 mg. to give sufficient basal narcosis, while the wiry, active patient required the full 120 mg. dose. As soon as the basal sedation was reached, atropine sulfate, in a dose related to size and vigor of the patient, was administered subcutaneously, the child was removed to the operating room, and endotracheal intubation performed under direct laryngoscopy by the oral or nasal route. Narcosis was satis-

factory in 100 per cent of the patients, the children arriving to the surgical amphitheater unconscious, and flushed, with respirations quiet but adequate and pulses within normal range. Induction of general anesthesia was rapid, smooth, and unattended by excitement. The emergence time varied from four to eleven hours, averaged five and one-half hours, and was complicated by nausea and vomiting in 30 per cent. Restlessness during the awakening period was minimal. The emergence time was tentatively considered that period from the administration of the avertin medication to the first postoperative waking responses of movement and return of reflexes.

Group II.—Although tribromethanol (avertin) produced a satisfactory basal anesthesia, it presented the troublesome disadvantages of a long preliminary preparation. For this reason, sodium propyl-methyl-carbinyl allyl barbiturate (Seconal),* a short-acting barbiturate, was chosen for trial, because of its quick action and its relatively short duration.[4] It differs from barbital and phenobarbital in being detoxified and oxidized within the body with great rapidity, rather than being excreted in the urine. The sedative effect of seconal is quite unique in that there are few depressive symptoms demonstrated six to ten hours after administration of the drug.[5] Its therapeutic index is greater than other common soluble barbiturates; larger doses can be given to obtain dramatic but safe sedation. It is very rapidly absorbed when given by mouth or by rectum. Oral administration was employed when feasible. Its rapid action was only slightly retarded when administered by the rectal route, which was used for small children or infants who could not swallow capsules. The pierced capsule was inserted in the manner of a suppository, the powder suspended in 5 c.c. of tap water and injected by rectal catheter. An additional 2 to 3 c.c. of water was given to assure the patient's receiving the full dose. The buttocks were then taped to prevent expulsion. Maximal analgesia was obtained in thirty to sixty minutes, but the action persisted for several hours.

The basis for estimating dosage was the age and weight of the patient, but consideration was given to the child's general condition, body build and vigor, and nervous reactivity.[6] Individual doses were increased above Breslow and Poncher's[7] recommended dose of 0.1 grain (6.5 mg.) per pound of body weight to a calculated dose of 0.14 to 0.15 grain (9 to 9.5 mg.) per pound. A group of nine patients received this heavy seconal medication administered orally or rectally. Atropine sulfate was given in addition to the seconal to prevent increased secretions. Narcosis was excellent, unconsciousness occurring in ten to twenty minutes in all cases; the patients were flushed, had adequate respiratory exchange, and responded only slightly, if at all, to painful stimulation. However, the time of the awakening was retarded, and considerable restlessness was observed. The length of time from administration of seconal to emergence varied from two and one-half to fifteen hours and averaged seven hours. In order to reduce the duration of narcosis, d-Desoxyephedrine hydrochloride, in a dosage of 1 mg. per fifteen pounds of body weight, was given to six patients. The combination of this drug and seconal seemed to enhance the postoperative

*Seconal is a preparation manufactured by Eli Lilly & Company.

restlessness, which led to its discontinuance. These six cases were considered too few to determine if the emergence time was decreased by the administration of the analeptic.

Group III.—Demerol is reported to have the drying action of atropine and the analgesic action of morphine without its respiratory depressant effect. Twenty-two patients were given a combination of seconal and atropine, with the object of reducing the seconal dosage, and, by means of this balanced combination, producing adequate sedation and drying of secretions. These patients, 2 to 10 years of age, were given .05 grains (3 mg.) of seconal per pound body weight, to a maximum total dose of 3 grains, followed by a hypodermic injection of demerol and atropine sulfate.

TABLE I. TABLE OF PREANESTHETIC MEDICATION—SECONAL, DEMEROL, AND ATROPINE*

AGE (YR.)	WEIGHT (LB.)	SECONAL† 1⅓ HR. PREOPERATIVELY (GRAINS)	DEMEROL AND ATROPINE HYPO. 1 HR. PREOPERATIVELY		ATROPINE ALONE HYPO. 1 HR. PREOPERATIVELY (MG.)
			DEMEROL (MG.)	ATROPINE (MG.)	
Under ½	12– 15	¾	–	–	–
½–1	Under 21	1	–	–	–
1 & 2	21– 30	1½	10	0.65	0.13
3 & 4	31– 38	2	15	0.08	0.16
5 & 6	39– 46	2½	15	0.11	0.19
7 & 8	47– 55	2¾	20	0.13	0.21
9 & 10	56– 63	3	25	0.16	0.32
11 & 12	64– 78	3	25	0.19	0.48
13 & 14	79–100	3	35	0.21	0.48
15 & 16	100–120	3	50	0.32	0.48
17 & 18	120–140	3	75	0.48	0.48
Over 18	140–160	3	75	0.48	0.48

*The above table presents maximum dose for healthy, normal children. Reduced doses are indicated for debilitated, cachetic, or actually ill patients.

†This total amount of seconal is to be given in divided doses; the first half, one and one-third hours before surgery; the second half, twenty minutes later, if the patient shows no undue sensitivity.

Table I illustrates the range of demerol, seconal, and atropine dosages used in Group III. The response to the medication was singularly satisfactory, though the depth of narcosis was not so great as that in the first two groups. The patients were sleeping lightly, and responded when moved or stimulated. The induction of anesthesia was smooth and unattended with coughing, excitement, or increased secretions. Emergence within an average of four hours was quiet and unaccompanied by restlessness. The incidence of nausea and vomiting seemed about the same as in the second (seconal-atropine) group of cases. Blood pressure readings showed no demonstrable change from those made prior to medication. These patients were in a sufficiently light state of narcosis to retain their cough reflexes. On questioning, none of them was able to recall the trip to the operating room.

TECHNIQUE OF ANESTHESIA AND DENTAL SURGERY

The technique of anesthesia in forty of the forty-two patients was the orotracheal or nasotracheal insufflation of ether. A wet gauze pack placed lightly in the pharynx around the tube safeguarded against aspiration of tooth particles,

cement, blood, and other debris. A 21-26 French gauge Magill catheter was used, and all intubations were affected by direct laryngoscopy. An angular finger valve (Figs. 1, 2, and 3) connected the endotracheal catheter to the ether-air insufflation apparatus (Beck-Mueller or Richardson). A Y piece in the inlet hose permitted the addition of oxygen when necessary. One patient was given Vinethene alone; another had the dental work completed in its entirety under the heavy seconal medication.

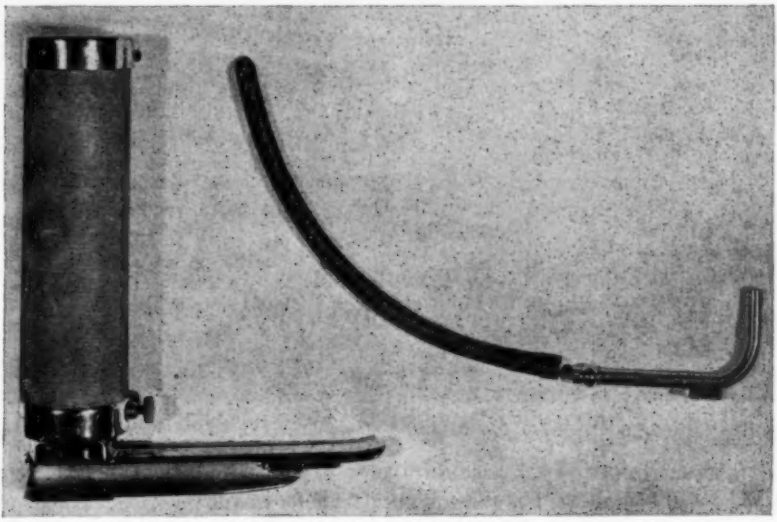

Fig. 1.—Laryngoscope with child blade, Magill endotracheal tube, and angular finger valve.

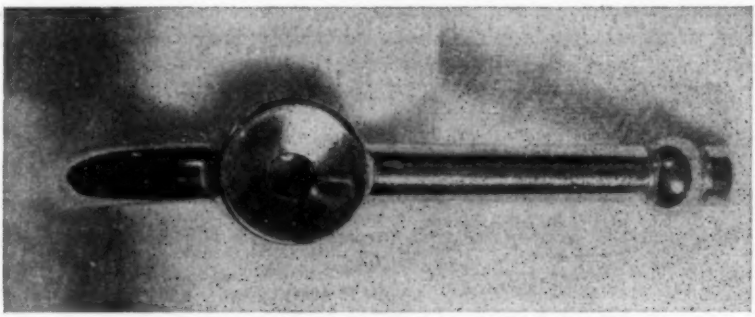

Fig. 2.—Close-up of angular finger valve showing outlet for exhalation.

The supine position, which was used in all cases, did not seem to hinder the performance of the dental surgery. Care was exercised to prevent the aspiration of foreign particles. The restorative work in many cases was very extensive, necessitating forty to one hundred twenty minutes for completion of the

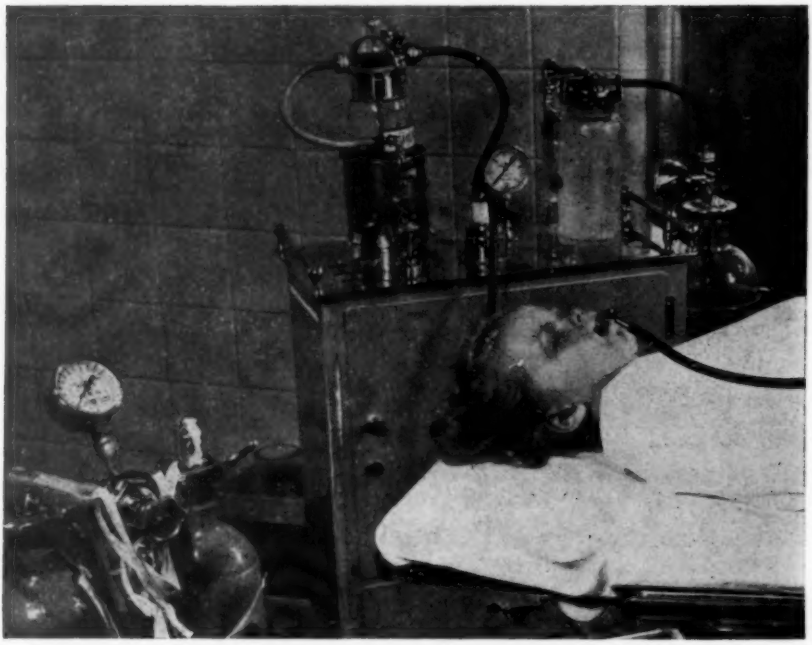

Fig. 3.—Patient anesthetized with vinethene and ether, intubated, and ready for dental repair.

task. The shortest surgical procedure took fifteen minutes; the longest, one hundred twenty minutes; the average surgical time was fifty-one minutes.

The dental work included the extraction of teeth, the restoration of carious teeth in cement and in silver amalgum, treatments with Thymol Iodide and with silver nitrate. No drilling was done in any case because of the explosion hazards of ether. However, it was felt that the probability of explosion was so slight with the use of insufflation ether-air, that the drilling of teeth could be safely used in the future, particularly if the foot-driven drill were used.

TABLE II. SUMMARY OF CASES

GROUP	I.	II.	III.
DRUGS	Tribromethanol (60 to 120 mg. per kg. body weight) and atropine	Seconal (0.14 to 0.15 grains per lb.), and atropine	Seconal (0.05 grains per lb.), demerol (10 to 25 mg.), and atropine
NO. OF CASES	11	9	22
EMERGENCE*	4 to 11 hours (average 5½ hours)	2½ to 15 hours (average, 7 hours)	2 to 7 hours (average, 4 hours)
EFFECTS OF MEDICATION	100% unconscious	100% unconscious	100% unconscious
RESTLESSNESS	++	+++	+
NAUSEA AND VOMITING	+	+	+

*From administration of medication to first response (movement and return of reflexes).
+ Minimal or insignificant.
++ Troublesome.
+++ Severe.

COMMENTS

In three groups involving forty-two patients (Table II), an attempt has been made to develop a safe and satisfactory technique for the preoperative sedation of the pedodontia cases. Basal narcosis has been the goal for the young child who was not to be reasoned with. However, patients 8 to 10 years old could for the most part understand the situation and cooperate. Therefore, medication was decreased at these age levels to produce sedation only.

Two hazards have been considered throughout this work. The first is the danger of respiratory obstruction after medication and prior to arrival in the operating room. The second is the danger of sensitivity to the drugs used, particularly to the barbiturates. In order to decrease the former, the reduced doses of the rapid acting drug, seconal, were used. There has been no occurrence of sensitivity in the forty-two cases herein reported and in an additional sixty patients other than dental medicated with seconal. On order to lessen the hazard of idiosyncrasy, the total seconal dose was divided into two equal parts and the second part given twenty minutes after the first. This technique was used in the last fifteen patients of the third group, and it is planned to continue it in the future.

Barbiturates present the disadvantages of variability of response and accumulation of effect, thus causing emergence from the fast-acting drugs to assume similar action to that of the long-acting drugs. It is conjectured that an analeptic agent such as d-Desoxyephedrine hydrochloride may reduce the recovery period and make the barbiturate approach more ideal.

SUMMARY

1. The psychic trauma to a child undergoing dental repair has been overlooked by many of us; studies are presented in the use of basal narcosis and general anesthesia for extensive pedodontia in forty-two patients.

2. Favor is given to the preoperative sedation of seconal in combination with demerol and atropine, followed by endotracheal insufflation of ether.

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Case Reports

REACTION IN TIBIA FOLLOWING INTRAMEDULLARY ADMINISTRATION OF FLUIDS

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MOUNT VERNON, N. Y.

FOR a number of years sternal puncture has been an accepted and approved method for obtaining bone marrow specimens for examinations in suspected blood dyscrasias. In 1940 the intramedullary route was proposed as an avenue for the administration of parenteral fluids, including glucose, plasma, and blood. Tocantins described this method in a preliminary report which appeared in 1940,[1, 2] and in subsequent papers appearing in the *Journal of the American Medical Association*,[3] and in the *Annals of Surgery*.[4]

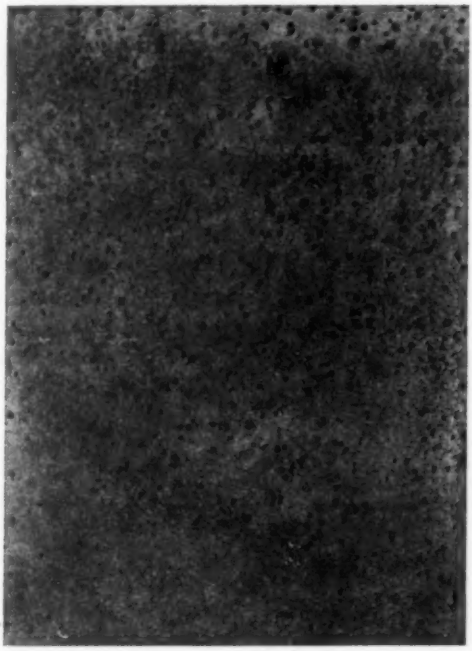

Fig. 1.—The photomicrograph shows necrosis and the presence of atypical giant cells with round cell infiltration.

The following case is reported because it showed an unusual complication and because the histologic picture simulated tuberculosis.

The patient was a 3-year-old, acutely ill girl, operated upon on June 13, 1945, for acute appendicitis with diffuse peritonitis. During the immediate post-operative period the venous route proved inadequate for administration of the

necessary fluids, and the intramedullary method was chosen. A needle was inserted into the marrow cavity of the left tibia and later another needle into the right tibia through which glucose in saline, plasma, citrated blood, and penicillin were administered. The child was discharged from the hospital on the fourteenth postoperative day. At this time the needle site over each tibia was well healed. These had been dressed with sulfanilamide powder and sterile gauze following the removal of the needles.

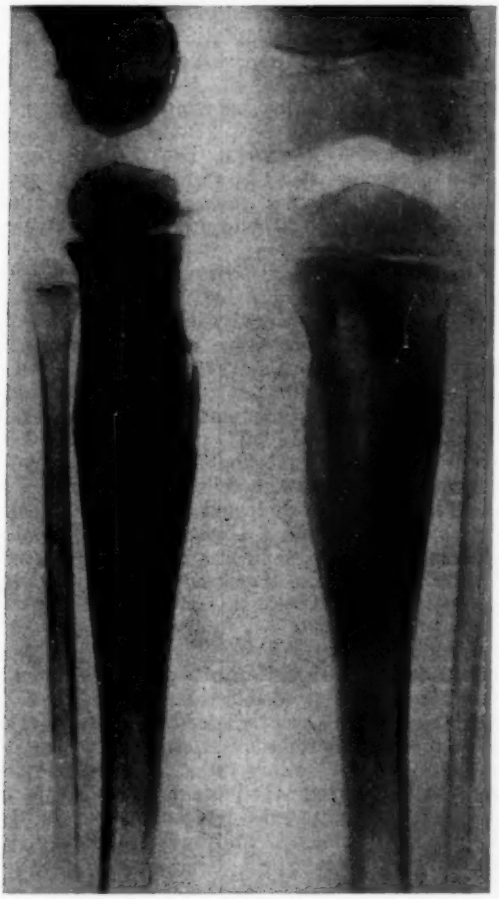

Fig. 2.—X-ray film of the tibia made fourteen weeks after onset of illness shows irregular destruction of the shaft with new periosteal bone production.

Culture of the peritoneal fluid taken at the time of operation showed no growth. Pathologic report of the removed appendix was "acute suppurative appendicitis."

On July 23, 1945, a painful, tender, fluctuant swelling appeared over the left tibia at the site of the previous infusion. An x-ray film of the left leg was reported negative. The mass was incised, and approximately 10 c.c. of thick,

creamy pus was evacuated from an abscess in the subcutaneous tissue. Healing was satisfactory.

On Sept. 13, 1945, she was brought into the office with a slightly tender, firm, nonfluctuant swelling of the left leg about one inch above the previous abscess. A tentative diagnosis of osteomyelitis was made, which was confirmed by x-ray examination. Films of July 23, 1945, were reviewed and revealed an area of rarefaction at the upper part of the left tibia in the metaphyseal region. The upper pole of the rarefaction was one inch below the epiphysial line. The new x-ray film of September 13, 1945, showed extension of this area of rarefaction. She was hospitalized and conservative treatment consisting of rest, high-caloric and high-vitamin intake was instituted. Penicillin was given intramuscularly in doses of 20,000 units every four hours. She was discharged from the hospital on Oct. 5, 1945. During her hospital stay her temperature never rose above 100° F.

Check-up x-ray examinations on Sept. 25, 1945, and Oct. 23, 1945, showed no essential changes in the pathologic process. X-ray films made on Nov. 25, 1945, showed that the area of rarefaction had progressed upward so that it was within one-half inch of the upper epiphysial plate with sclerosis about the upper and lower poles and with new periosteal bone production generally about this fusiform swelling.

Surgical intervention was deemed advisable. Saucerization of the involved portion of the tibia was performed on Dec. 11, 1945. One-half ounce of thick pus was evacuated from the marrow cavity of the bone. The abscess cavity was found to be lined with granulation tissue which also was plugging the cloaca through the cortical portion of the tibia.

The postoperative course was uneventful. There has been complete healing of the wound, and check-up x-ray films reveal the absence of active infection and complete filling in of the saucerized bone.

Microscopic section of the granulation tissue reported by Dr. A. A. Eggston showed numerous lymphocytes, plasma cells, and fibroblasts. There were some areas of necrosis and a few multinucleated giant cells. There was evidence of reticulo-endothelial hyperplasia and a slight tendency to cellular arrangement into tubercle-like areas. The diagnosis was chronic osteomyelitis, suggestive of tuberculosis. A number of the sections were stained for tubercle bacilli, but none could be demonstrated.

CONCLUSION

This method for the administration of fluids is of great value when other routes are not feasible, and this possible complication should not detract from its use as a life-saving measure when indicated.

The histologic appearance of the granulation tissue resembled tuberculosis, but careful examination of the sections failed to reveal the presence of tubercle bacilli. The postoperative course of the patient rules out tuberculosis.

Clinically, the reaction simulated a pyogenic osteomyelitis, but the negative cultures from the pus in the abdomen and in the tibia suggest that the infection was not of the ordinary pyogenic type.

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MENINGITIS COMPLICATING CEPHALHEMATOMA

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HARRY W. ORRIS, M.D.
NEW YORK, N. Y.

CEPHALHEMATOMA is generally considered to be an almost innocuous condition of the newborn state, running a self-limited course. Grulee and Sanford[1] state that infection is certainly extremely rare. In reviewing the literature we have been unable to find any published report of spontaneous secondary infection of a cephalhematoma leading to purulent meningitis. We therefore present such a case.

A male child was born at Lincoln Hospital on June 6, 1946, from the right occipitoanterior position by normal spontaneous delivery. Though a full-term infant and in good condition, he was admitted to the premature nursery because of a low birth weight of 5 pounds and 5 ounces. The child passed meconium, voided, and took his feedings well. A mass, 4 cm. in diameter, was noted overlying the left parietal bone and extending up to, but not crossing, the sagittal suture. This mass was tense and nonpulsating. A parietal cephalhematoma was diagnosed. On the fourth day of life the baby became mildly jaundiced. However, there was no evidence of blood dyscrasia. The child continued to take all feedings well and regained 1¼ oz. of the initial 3 oz. weight loss. Mild edema of both thighs and buttocks was also observed at this time. The cephalhematoma remained stationary in size and the edema and icterus persisted. By the seventh day the infant had exceeded his birth weight by ¼ oz. On this day the patient's temperature suddenly rose to 101.4° F. Physical examination revealed no abnormal findings other than those previously noted. Penicillin therapy was started, 5,000 units being given every three hours. By the following day the temperature had dropped to 99.0° F.; the baby seemed much improved. Two days later, on the tenth day of life, the temperature again became elevated to 101.8° F. and the child refused his feedings. Resort was made to feeding by gavage. The cephalhematoma did not change in size or consistency, but the edema and icterus both disappeared. The baby had three loose, yellow stools and several small hypodermoclyses were administered for some loss of skin turgor. Treatment with penicillin was continued on empirical grounds. Physical examination on this, the tenth day, showed the ears, nose, and throat to be normal; the lungs were clear to percussion and auscultation; abdominal palpation was negative; there was no bulging of the anterior or posterior fontanels; there were no pathologic reflexes; the cephalhematoma showed no change. Urine examination was negative. Diarrhea, however, persisted, and oral feedings were therefore discontinued temporarily. The patient was maintained by parenteral fluids for the following two days. By the thirteenth day the diarrhea had abated and an Alacta formula was started. On the fourteenth day the temperature was 99.0° F. and the administration of penicillin was stopped. The baby was then taking all oral feedings well. His condition remained improved until the eighteenth day, when the temperature suddenly rose to 104.0° F. The child became cyanotic, exhibited signs of marked respiratory distress, with infrasternal and suprasternal retraction on inspiration, and appeared critically ill. Moist, inspiratory râles were present throughout both lung fields and tetanic convulsive movements of the face and arms were noted. Sulfadiazine was ordered and the penicillin was started again with 15,000 units as the three hourly dose. In case the convulsive disorder might be an expression of hypocalcemic

From the Pediatric Service of Dr. Harry S. Altman, Lincoln Hospital.

tetany, blood was withdrawn for a serum calcium level and 5 c.c. of a 10 per cent solution of calcium gluconate was administered intravenously without benefit. At this time no evidence of meningeal irritation such as bulging fontanels, nuchal rigidity, or positive Kernig's or Brudzinski's signs were elicited. The child continued to do poorly despite sulfadiazine, penicillin, and oxygen therapy, and expired six and one-half hours later.

Permission for necropsy was obtained. The anatomic diagnoses were: (1) meningitis, purulent; (2) cephalhematoma, left parietal region, secondarily infected; (3) bronchopneumonia, bilateral, confluent; and (4) fatty degeneration of the liver.

There was a somewhat fluctuant mass about 5 cm. in diameter in the left parietal region of the scalp. On incision, thick, sanguinopurulent material exuded from the mass. The abscess was well demarcated and extended down to the bone, the periosteum having been destroyed and the surface of the parietal bone presenting a shaggy, roughened appearance, with some thinning of the bone.

Upon opening the cranial cavity the base of the brain was found to be bathed in a yellow, purulent material. There were small, localized areas of pus underlying the meninges all over both hemispheres of the brain. There was edema of the cerebrum with some congestion of the small pial vessels. On the internal surface of the left parietal bone, approximately 1.5 cm. inferior to the site of the abscess, a purulent area was noted surrounding one of the dural veins. Just beneath this localization of pus there was a purulent exudate on the corresponding area of the brain.

The thoracic cavity was opened and the organs were found to be in normal position and relationship to each other. There was no free fluid in the pleural cavities. The lungs were of an orange-red color, firm and rubbery in consistency. There were small areas of petechial hemorrhage in the pleurae anteriorly. On section, the lungs were more or less consolidated. No frothy fluid exuded on pressure. There were no local areas of infarction. The lungs were of a homogeneous appearance. The trachea and bronchi were slightly edematous and congested. No mucus or obstructions were found in the lumina.

The liver was deep purple, but there were many areas of yellow discoloration on the anterior surface. The organ was firm in consistency. On section, it could be cut with ease and showed small areas of fatty degeneration. The spleen, adrenals, and kidneys were normal. The alimentary tract was normal throughout.

All media planted with material from the abscessed cephalhematoma and from the meninges yielded *Bacillus pyocyaneus* in pure culture.

COMMENT

We have presented a case of a newborn infant in whom a cephalhematoma became secondarily infected in the absence of any trauma and without interference by "needling" or any other procedure, and in whom the resulting abscess went on to burrow through the parietal bone, causing a purulent meningitis with fatal termination. The organism which was recovered from both the infected cephalhematoma and from the meninges was found to be *B. pyocyaneus* (*Pseudomonas pyocyanea*). Blood-borne infections by this organism are not rare in the neonatal state and frequently pursue a fulminating course.[2] The primary site of infection is described as usually being in the gastrointestinal tract, the umbilicus, or the skin.[2] Our case presented no evidence of infection of the skin or umbilicus, and we feel that it is not unreasonable to assume that our patient had a focus in the gastrointestinal tract which seeded the cephalhematoma by

way of the blood. Holt and McIntosh[3] state that following severe traumatism, cephalhematomata may go on to abscess formation and either open externally or burrow, but that this result is seldom seen.

Our case re-emphasizes the fact that meningitis may occur in the newborn without the classic signs and symptoms of the disease. It, therefore, is important that diagnostic lumbar puncture be done in that age group when there is unexplained sepsis.

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American Academy of Pediatrics

Proceedings

REPORT OF THE MEETING OF THE EXECUTIVE BOARD OF THE AMERICAN ACADEMY OF PEDIATRICS

CHICAGO, ILL., NOV. 24, 25, 1946

A meeting of the Executive Board was held at the Palmer House, Chicago, on Sunday and Monday, November 24 and 25, 1946. The first session was called to order at 10 A.M., Sunday, by the President, Dr. Jay I. Durand. There were present Drs. Jay I. Durand, Lee Forrest Hill, Marshall C. Pease, Edgar E. Martmer, Oliver L. Stringfield, Paul W. Beaven, Warren W. Quillian, James W. Bruce, George F. Munns, Roger L. J. Kennedy, Vernon W. Spickard, Félix Hurtado, Joseph S. Wall, and Clifford G. Grulee.

The following applicants were elected to Fellowship:

Region I

George R. Alpert, New York, N. Y.
Glidden Lantry Brooks, Lewiston, Maine
Enid C. Brown, Buffalo, N. Y.
Charles C. Chapple, Philadelphia, Pa.
Martha L. Clifford, Hartford, Conn.
David J. Cohen, Meriden, Conn.
Henry Cohen, Brooklyn, N. Y.
Joseph H. DiLeo, New York, N. Y.
David Dragutsky, Brooklyn, N. Y.
Herman Eisenberg, Washington, D. C.
Henry M. Eisenoff, New York, N. Y.
L. Stearns Fannin, Bradford, Pa.
John L. Finnegan, Flushing, Long Island, N. Y.
de la Broquerie Fortier, Quebec, Que.
Irvin Fradkin, Freeport, Long Island, N. Y.
Clarence F. Friedman, Brooklyn, N. Y.
Martin J. Glynn, Jr., Rockville Centre, N. Y.
Harold G. Grayzel, Brooklyn, N. Y.
Martin Green, Atlantic City, N. J.
Adelard Groulx, Montreal, Que.
Ernest T. Heffer, Brooklyn, N. Y.
Theodore G. Holzsager, Brooklyn, N. Y.
Philip J. Kozinn, Brooklyn, N. Y.
Alan Charles Levin, Brooklyn, N. Y.
Leo Litter, Hartford, Conn.
George W. McCormick, Staten Island, N. Y.
Israel Miller, Brooklyn, N. Y.
Ralph E. Moloshok, New York, N. Y.
J. Leonard Moore, Princeton, N. J.
Alexander S. Nadas, Greenfield, Mass.
Benjamin Newman, Brooklyn, N. Y.
Nolan A. Owens, Washington, D. C.

Alexander E. Rostler, Fall River, Mass.
Russell E. Sangston, Uniontown, Pa.
William A. Schonfeld, New York, N. Y.
Herbert Sherwin, Cambridge, Mass.
David W. Sherwood, Wellesley Hills, Mass.
Eleanor R. Stein, Harrisburg, Pa.
Stuart S. Stevenson, Fairfield, Conn.
Stewart C. Wagoner, Schenectady, N. Y.
Irving Weinstock, Brooklyn, N. Y.
Harry Wexler, Brooklyn, N. Y.
Herbert M. Williams, Kew Gardens, N. Y.
Benjamin J. Wood, Pittsburgh, Pa.

Region II

Egbert V. Anderson, Pensacola, Fla.
Thomas Davis Dotterer, Columbia, S. C.
Don William Freeman, Denison, Texas
Edward Alun Harris, Fairfield, Ala.
Bernhard H. Hartman, Asheville, N. C.
Basil Bradbury Jones, Richmond, Va.
William White Kelton, Jr., Austin, Texas
David William Martin, West Palm Beach, Fla.
Eugenia Elizabeth Murphy, Arlington, Va.
Edwin Paul Scott, Louisville, Ky.
Amelia Burns Sheftall, Jacksonville, Fla.
Daniel Lesesne Smith, Jr., Spartanburg, S. C.
Edwin Robeson Watson, Macon, Ga.

Region III

James H. Bahrenburg, Canton, Ohio
J. Joseph Baratz, Chicago, Ill.
Richard Winston Blumberg, Cincinnati, Ohio
Mary S. Boyden, Lawrence, Kan.
Lyman Ray Critchfield, St. Paul., Minn.
John C. Danahy, Cincinnati, Ohio
David Richard Davis, Emporia, Kan.
Vernon Richard DeYoung, Chicago, Ill.
Mark Wendell Dick, Grand Rapids, Mich.
Katherine Dodd, Cincinnati, Ohio
William H. Eberle, Ashtabula, Ohio
Harry L. Faulkner, Chicago, Ill.
Joseph Henry Garthe, Rockford, Ill.
Kurt Glaser, Chicago, Ill.
William H. Gronemeyer, Lakewood, Ohio
Lloyd E. Harris, La Fayette, Ind.
Robert D. Hart, Peoria, Ill.
Manes S. Hecht, Detroit, Mich.
Oliver William Hosterman, Columbus, Ohio
Gertrude E. Howe, Chicago, Ill.
Robert L. Jackson, Iowa City, Iowa
F. Craig Johnson, Denver, Colo.
George John Klok, Council Bluffs, Iowa
Hyde S. Leland, Detroit, Mich.
Sol Londe, St. Louis, Mo.

Emerson K. McVey, Chicago, Ill.
Frederick J. Margolis, Kalamazoo, Mich.
Irving B. Richter, Chicago, Ill.
John Richard Schroder, Janesville, Wis.
Charles L. Steinberg, St. Paul, Minn.
Carl F. Wagner, Cincinnati, Ohio
Paul V. Woolley, Jr., Detroit, Mich.
Melvin Francis Yeip, Cleveland, Ohio
Ruth M. Kraft, Detroit, Mich.

Region IV

Leo S. Bell, San Mateo, Calif.
Sherod M. Billington, Seattle, Wash.
Edward Campion, San Rafael, Calif.
Charles H. Cutler, San Francisco, Calif.
Richard D. Cutter, Palo Alto, Calif.
Lucas W. Empey, Sacramento, Calif.
Scott H. Goodnight, Portland, Oregon
Percy F. Guy, Seattle, Wash.
Archie F. Hardyment, Calgary, Alta., Can.
Barbara Hewell, Honolulu, T. H.
George D. Husser, Richmond, Calif.
William M. Petty, Santa Maria, Calif.
George O. Prieur, Calgary, Alta., Can.
Saul J. Robinson, San Francisco, Calif.
Vincent Rounds, Los Angeles, Calif.
Mandel L. Spivek, Beverly Hills, Calif.
Robert A. Tidwell, Seattle, Wash.
Homer T. Clay, Tacoma, Wash.
Peter Cohen, San Francisco, Calif.
David M. Goldstein, Los Angeles, Calif.
Edward A. Loeb, Fontana, Calif.
Stanley Louie, San Francisco, Calif.

Region V

Paulo de Barros Franca São Paulo, Brazil
José de Magâlhães Carvalho, Rio de Janeiro, Brazil
Odilon de Andrade Filho, Rio de Janeiro, Brazil
Estella Budiansky, Porto Alegre, Rio Grande do Sul, Brazil
Roberto Berro, Montevideo, Uruguay
Bolívar Delgado Correa, Montevideo, Uruguay
María Luisa Saldún de Rodríguez, Montevideo, Uruguay

Upon application the following were granted Emeritus Memberships:

Iris M. Chamberlain, Chicago, Ill. (Guatemala)
Elmer G. Horton, Columbus, Ohio
Frederick H. Meichner, Long Island City, N. Y.
E. C. Mitchell, Memphis, Tenn.
H. L. Moon, White Salmon, Wash.
J. Phillips Stout, Jersey City, N. J.
Henry Washeim, Jr., Utica, N. Y.

The resignations of Dr. Henry N. Pratt, New York City, Dr. Susan P. Souther, Columbus, Ohio, and Dr. Norman Nixon, Laguna Beach, Calif., were accepted.

Dr. M. Scherzer, Montreal, Que., was reinstated at his request.

Dr. Luis Siri, Argentina, was voted to Associate Membership upon recommendation of Dr. Félix Hurtado.

The following were given leaves of absence: Dr. Leo Batell, Durham, Conn., Dr. Marion S. Morse, Endicott, N. York., and Dr. Raymond H. Somers, San Jose, Calif.

Report of Region I

This will probably be the last report from Region I as it is now constituted. The Academy's Study of Child Health Services has been the main activity throughout our region. Through the efforts of our state chairmen, our region was the first to have all our states organized with executive secretaries and offices. One of our states was first, exclusive of North Carolina, to have all our questionnaires distributed. For these accomplishments we wish to thank the state chairmen: Drs. Foster of Maine, Stewart of New Hampshire, Clark of Vermont, Baty of Massachusetts, Root of Connecticut, Orr and Wilke of New York, Murray of New Jersey, Gilmartin and Barba of Pennsylvania, Handy of Delaware, Wharton Smith of Maryland, and Copeland of Washington.

At a meeting of the state chairmen, October 1, we were instructed to report their following unanimous opinions:

1. That a representative committee be established to interpret the findings of the Study of Child Health Services and make recommendations and policies to the Executive Board.

2. That it is their recommendation that the members of the Academy support the proposed meeting of the Fifth International Congress when it is held. They further unanimously voted that due to unsettled conditions in this country, Europe and Asia, the holding of the Fifth International Congress in July, 1947, as proposed, is premature and should be postponed.

3. They specifically directed us to express their thanks and appreciation to the Committee in New York for arranging such an outstanding regional meeting.

Forty-one pediatricians are recommended for Fellowship in the Academy.

Respectfully submitted,

OLIVER L. STRINGFIELD, Regional Chairman
PAUL W. BEAVEN, Associate Regional Chairman

Report of Region II

Continued expansion of Academy membership in this area reflects a growing interest on the part of qualified pediatricians in the purposes and ideals of the organization. Since the January meeting at Detroit there have been sixteen completed applications submitted for consideration through regular channels. No formal regional meeting has been held since the last report. During the regular session of the Southern Medical Association at Miami, there will be a luncheon meeting for members of Region II, at which time questions pending consideration at the National Convention in Pittsburgh and problems arising from the Study of Child Health Services will be considered.

As in other sections of the country, activity during the past nine months has been primarily concerned with the organization and development of the Survey in the various states. Slow to get started in a few areas, the work has gained impetus due to the outstanding work of some state chairmen, as well as the full support of the State Medical Associations and of similar organizations. Many state pediatric societies, whose work had become disrupted during the war years, have reorganized, and their members are showing a willingness to assume responsibility for developing the program of the Academy. Florida and Virginia are outstanding in this respect. Members are actively helping in refresher courses and are serving as teachers of postgraduate medical instruction in pediatrics in addition to the duties and responsibilities of private practice. The Academy receives no outstanding identification in its activities but works through existing organizations and groups, using their facilities in attempting to promote child health.

Respectfully submitted,

WARREN W. QUILLIAN, Regional Chairman

Report of Region III

The Child Health Services Survey is now under way in most of the states of Region III. Consequently, most of the state chairmen have little to report in regard to other Academy activities as the survey comprises a full-time job for them. The attendance of the state chairmen at the Child Health Services meeting in Chicago in September was excellent. Many perplexing problems concerning the questionnaire were ironed out during the two-day session.

Reports from Missouri, Ohio, North Dakota, and other states indicate that the Academy organization in these states is actively cooperating with various other state groups which are interested in the welfare of children.

In Illinois, Dr. Poncher has requested the Child Health Services Study committee to continue to function as an advisory committee to the Illinois State Medical Society. Such an arrangement should expediate all Academy projects in which the support and interest of all physicians in the State are desirable. Closer cooperation and planning with all agencies in the State which have to do with the health and welfare of children are anticipated. This plan might be worthy of scrutiny by all state chairmen; there is certainly a great amount of important work, much of it an accumulation of the war years, to be done in the near future. With the completion of the Child Health Services reports, the Academy organization should be ready to go smoothly ahead as a leading force in the child health activities in most of the States of Region III.

Region III now has on deposit in the First National Bank of Winnetka, Ill., funds to the amount of $2,192.61 plus uncomputed accumulated interested since Jan. 1, 1946. Funds to the amount of $19.07 were expended in preparatory work for the Spring, 1946, regional meeting. The regional meeting was later canceled by unanimous vote of the state chairmen.

The Treasurer of the Academy holds bonds to the credit of Region III in the amount of $1,850.00 with a face value of $2,500.00.

Present enrollment in Region III is 500 members. Thirty-four new applicants will be voted upon for membership at the November (1946) meeting of the Executive Board.

Respectfully submitted,
GEORGE F. MUNNS, Regional Chairman

Report of Region IV

Through the State Chairmen, all members of Region IV were contacted to give an opinion regarding financial support from the Academy for the International Pediatrics Congress. The results indicated that the membership was 2:1 in favor of giving some financial support by assessment of members of the Academy. However, the majority of the members felt 1947 was too early to have such a meeting; since the date has been changed to July, I am sure there will be more objections to a 1947 meeting.

A regional meeting of representatives of the various states for the Child Health Survey was held in San Francisco, September 17 and 18. This will be included in the Committee Report and Study of Child Health Care.

Respectfully submitted,
VERNON W. SPICKARD, Regional Chairman

Report of Region V

The principal activities after the last meeting of the Executive Board of the Academy have been devoted to informing the branches of the region about the possibilities of the celebration of the First Pan-American Pediatrics Congress and at the same time the first general meeting of Region V, both events in combination with the International Congress of Pediatrics, which will be held in New York City, July, 1947.

Since last agreement of the Executive Board of the Academy, we have sent a note to the different branches, containing all the explanation about this matter. We have decided to celebrate the meeting of Region V in Washington, D. C., three days before the Interna-

tional Congress in New York. This meeting will be presided by a head table formed by the Members of the Executive Board of the Academy and the chairmen of Region V.

The first reunion will be devoted to consideration of the internal affairs of the region, in order to establish the definite organization of Region V under the by-laws of the Academy. In this meeting, the chairman of Region V will give a general report about the region since the incorporation of the Latin-American Division to the Academy up to date.

We have sent a questionnaire to the different Latin-American countries for the preparation of a special book of the pediatric field in America, introducing to the United States the history of Latin-American Pediatrics. In this book you will find very important remarks, for example: foundation of the Latin-American Universities; the San Marcos University of Lima, the oldest in America, the University of Mexico, founded a short time later, and the University of Havana, which is also an old University with more than two centuries' existence, the special organization of the pediatric services, in their double aspect, academic, in connection with the teaching, offering a synthesis between the different pediatric schools, and in the public health aspect, referring to the organization of Children's Hospitals in America.

In the first aspect, referring to the academic field, it would be a great pleasure for me to introduce to United States pediatricians the outstanding figures, true pioneers of our pediatric sciences, Louis Morquio from Montevideo, Araoz Alfaro from Buenos Aires, Olinto de Oliveira and Fernandez Figueiras from Brazil and Angel Arturo Aballi from Havana.

In the second aspect, the social assistance, we will show you our principal units, represented by beautiful children's hospitals, as the wonderful Hospital del Nino de Mexico, the special Hospitals for Children of Chile (three new and beautiful buildings), "Pereira Rosell Hospital" of Montevideo, and the "Municipal Children's Hospital" of Havana. They are all splendid hospital units very well equipped to the specification of the Official Standard Hospital of the American Medical Association.

It would also be a very important point to consider in the pediatric field of the Latin-American countries, the goal reached by the research department, because we know very well that the general knowledge of medicine, simply applied to the diagnosis or treatment, is practically a routine if it would not be accompanied by scientific consideration, supported by research.

One of the principal points studied by the Latin-American research has been the bacteriologic aspect related with the etiology of gastrointestinal disturbances. In that aspect the Uruguayan Pediatric School is very well known. It is conducted by Professor Hormaeche, author of the very important theory called "Montevideo Doctrine" about the pathologic influence of the salmonella group against "Kiel Doctrine." The Chilean Pediatric School has also devoted very important studies about the same question and is conducted by Professors Cienfuegos and Scroggie and co-workers. In the clinical aspect of the metabolic disorders of the gastrointestinal troubles, the Argentinian Pediatric School has realized very important research which was chiefly conducted by Professor Carril and in the same question, the contribution of Professor Burghi of Montevideo and the etiological classification selected by Zervino from Montevideo too are also very outstanding. All this matter referring to the gastrointestinal disturbances in order to study the etiology, pathogenesis, and treatment has constituted the principal goal of the Cuban Pediatric School conducted by Professor Aballi and myself with the cooperation of many co-workers of our pediatric chair.

Also a point very attractive for special mention are the studies realized by Professor Agustin Castellanos in order to obtain a safe vital diagnosis of congenital heart diseases by means of the "opaque angiocardiogram." This method permits the visualization of the heart after the introduction of the opaque substance in the vein of the arm in a first view which we call angiodextrocardiogram because it only shows the right heart. A few seconds later we can obtain a second view which shows the left heart with the gross vessels which we call angiolevocardiogram. This method permits at the present time to establish a positive and real diagnosis of all cardiac malformations.

Complete information of etiology and production of the important phenomenon of the atelectasis and its influence on many different lung troubles is also a brilliant point of the

Latin-American Pediatric Research. In that sense, the studies of Professor Valledor of Havana, Professor Vacarexa of Buenos Aires, and Professor Scroggie of Chile represent a very nice contribution.

After considering the great development of scientific centers of the Latin-American countries, we will include a relation of the different international connections represented by many filial associations of important United States Associations; The American Academy of Pediatrics, The A. M. A., The A. P. H. A., The P. A. M. S., and finally the great importance of political connections represented by the Pan-American Union and, particularly in the medical field, by the Pan-American Sanitary Bureau, which has been, perhaps, the most important link in the last ten years among the scientific research centers of America.

For all these reasons we consider that our program to realize the first Pan-American Pediatric Congress will be a firm step over the way of a cordial and positive friendship among all our countries, supported and conducted by the purest link among human dignity; that is, science and country friendship.

We hope that this effort of the Latin-American Group will be received with deep sympathy by our fellows of the United States to whom we devoted our best wishes and efforts.

After these Pan-American Pediatric Meetings, we will continue together in the work for permanent improvement of Region V as members of the great family of the American Academy of Pediatrics.

Respectfully submitted,
FÉLIX HURTADO, Regional Chairman

Report of the Secretary

During the past year, the Academy has launched forth upon an effort which is probably as ambitious as any that has ever been attempted by a small group in the United States. Of course, I am speaking of the survey of child health services. If we are to have local or national legislation, this legislation should be based on facts and not suppositions, and it is with that in mind that the Academy has undertaken this survey. The cooperation of all the members and the exhaustive work carried out by the state chairmen is something of which the Academy may well be proud. I think that all of us will say the right man was chosen when Dr. John P. Hubbard was put in charge, and we must credit him with much of the success, but no man alone without the cooperation of cohesive organization could have brought about the results which have been attained in this instance. The organization of the Academy on a state basis has justified itself.

The International Congress of Pediatrics, as at present projected, will occur in July in New York City. This has materially altered the plans of the Academy to hold a Pan-American Congress in 1948. However, thanks to the activities of the men in Washington, especially Dr. Edgar P. Copeland and Dr. Joseph S. Wall, we are well on the way to arranging a preliminary meeting of the Latin-American groups under the Chairmanship of Dr. Félix Hurtado. This will occur in Washington just previous to the International Congress. The final arrangements for the meeting have not yet been made.

Due, more than most of you realize, to the efforts of Dr. Joseph S. Wall, the legislation for National Governmental Control of Child Health Agencies and, in fact, of the whole picture of medical attention to the child has been at least temporarily avoided. Most of us felt that this was striking at the very heart of child health in this country and that it would have been a disastrous move for the children, and we may congratulate ourselves that one of our own group was so prominent in preventing this legislation.

You will be asked at this meeting to vote on the question of redistricting of the Academy. This, to my way of thinking, is long overdue. The present arrangement does not give equal representation on the Executive Board and while there is slight discrepancy in the new arrangement, it is far better than the old. The Secretary hopes that this arrangement can be brought about. If it is, the Secretary's office will take over subsidiary meetings in different parts of the country, in addition to the National meeting which is already carried on in his office.

Dr. James G. Hughes has taken over the Chairmanship of the liaison Committee with the American Legion. With the members of the Academy who have come out of service this will be of especial interest. The Legion has funds to carry on child care work throughout the country, and it wishes direction of the American Academy of Pediatrics in carrying this out. Unquestionably, when our survey is finished and properly recorded, such an affiliation will result in great benefit to the children of the country and it is to be hoped that we can have active affiliates in each state to promote and direct the action of the Legion.

For several years now, the Academy has been mulling over the question of a library and museum. The material for the library is available and there are accumulating many museum pieces, as well. While the library will not be able to finance this from its own funds, it seems likely that our friends in many activities will be willing to provide a sufficient fund so that a building can be erected. It will be necessary, however, to provide funds for carrying this on and at the present time the method of doing this has not been determined.

A change has come with respect to the services which we have been rendering to Region V members. We have done away with the abstracts in Spanish and the dues have been raised to $10.00 for all members. This will enable us to pay the expenses of a representative from that Region to at least one of our Executive Board meetings each year, preferably that held at the time of the annual meeting. It is to be hoped that this solution will meet the approval of Region V, which it seems to have, and will also make for closer relationships in the Academy.

The men in service are coming home and from a high of nearly 400 members there are less than seventy now in service. It is gratifying to know that nearly all of the men who have come back have stepped into practice and are doing well. The chief difficulty has been to find a place to live, but that, I think, has been satisfactorily solved by most of them.

It is now my unpleasant duty to report to you the names of those who have left us since the last meeting: Arthur W. Benson, Troy, N. Y., Murray B. Gordon, Brooklyn, N. Y., Harold C. Joesting, Los Angeles, Calif., Harold O. Ruh, Cleveland, Ohio, Dr. Stewart H. Welch, Birmingham, Ala. Emeritus Fellows: Stanley D. Giffen, Toledo, Ohio, Homer Woolery, Bloomington, Ind., and Harry R. Lohnes, Buffalo, N. Y.

Respectfully submitted,
CLIFFORD G. GRULEE, Secretary

Report of the Treasurer

(For this report, see following page.)

It was voted by the Executive Board that after the February meeting the traveling expenses and $10.00 per diem for each appearance on the program be given for each participant in the general program and for one participant in each round table.

It was voted that hereafter committee reports be distributed only at the Annual Meeting and not be sent out previously to the members, since they are published in the JOURNAL.

The request of Herbert C. Miller of Kansas City for recognition by the Executive Board of his attempt to gain information concerning the incidence of congenital anomalies associated with rubella infections in the mother, and in the second place to obtain information which will help in setting up more intensive studies in case our survey indicates that the problem is a fairly extensive one was approved by the Board with the request that questionnaires not be sent out until after our survey is completed.

The Executive Board approved the appointment of a representative to the National Commission on Child Health set up by the President.

Dr. Hugh McCulloch was present in person to discuss the question of publication of the JOURNAL. This was discussed quite extensively and it was decided to wait for the recommendation of the Editorial Board at the meeting of the Academy in February.

Mr. Lawrence J. Linck, Executive Director of the National Society for Crippled Children and Adults, Inc., requested in person the appointment of a liaison officer to that group by the Academy. His request was granted and George F. Munns was appointed by the president.

Report of the Treasurer

STATEMENT OF RECEIPTS AND DISBURSEMENTS, JULY 1, 1946, TO OCT. 30, 1946

Balance in checking account, July 1, 1946			$11,187.49
Balance in savings account, State Bank & Trust Company			8,214.89
Balance in savings account, First National Bank & Trust Co.			1,560.09
			20,962.47
Receipts:			
Dues		$39,658.13	
Wartime Assessment		15.00	
Exhibits—November, 1946 Meeting		4,640.00	
Annual meeting registration, November, 1946		4,180.36	
Annual meeting round tables, November, 1946		1,494.38	
Initiation fees		1,925.00	
Interest earned		327.50	
Pamphlets—Child Health Record	$ 204.25		
Immunization Procedures	116.08		
Vitamins	6.00	326.33	
Subscriptions—men in service		100.00	52,666.70
			$73,629.17
Disbursements:			
Annual Meeting—November, 1946		$ 800.96	
Bank charge and exchange		44.84	
Certificates and mounting		48.56	
Executive board		647.16	
Miscellaneous		109.30	
Office supplies and equipment		106.24	
Postage		163.54	
Rent		778.50	
Salaries—Secretary	$4,000.00		
Assistant Secretary	666.66		
Stenographer	1,000.00		
Office	785.00	6,451.66	
Stationery and printing		231.04	
Subscriptions		9,629.81	
Telephone and telegrams		277.54	
Travel-Secretary		12.77	
Treasurers' bonds		62.50	
Expense—regions	$ 158.96		
States	77.03		
committees	975.53	1,211.52	
Pamphlets—Child Health Record	21.55		
Immunization Procedures	3.55	24.90	20,600.84
			$53,028.33
Balance in checking account, October 30, 1946			$41,328.35
Balance in savings account, State Bank & Trust Company			10,139.89
Balance in savings account, First National Bank & Trust Co.			1,560.09
			$53,028.33

Reports of Committees

Warren R. Sisson and John P. Hubbard reported on the Study of Child Health Services. A committee was appointed to choose a publicity expert for the use of the Committee for the Study of Child Health Services.

Report of the Committee for the Study of Child Health Services*

BUDGET FOR GRANT OF $116,000 FROM NATIONAL FOUNDATION FOR INFANTILE PARALYSIS

	BUDGET FIRST YEAR	EXPENDED TO 10/31/46	BALANCE REMAINING	BUDGET SECOND YEAR
Salaries:				
Regional directors	$19,000.00	$13,946.38	$ 5,053.62	$16,000.00
Travel:				
Regional directors	6,000.00	3,567.52	2,432.48	3,000.00
Salary:				
Administrative Asst.	3,000.00	2,142.54	857.46	3,000.00
Salaries:				
Stenographers	4,000.00	2,422.73	1,577.27	4,000.00
Office				2,000.00
Supplies				
Printing	8,000.00	8,000.00		5,000.00
Telephone & telegraph				
Postage				
Educational survey	15,500.00	806.93	14,693.07	15,500.00
Statistical dept.	12,000.00	11,886.24	113.76	
Totals	$67,500.00	$42,772.34	$24,727.66	$48,500.00

ESTIMATED BUDGET FOR STATISTICAL ANALYSES (National Institute of Health Account Oct. 1, 1946, to Dec. 31, 1947)

ITEM	NUMBER OF PERSONNEL	ANNUAL RATE	OCT. 1, 1946, TO JUNE 30, 1947 (9 MONTHS)		JULY 1, 1947 TO DEC. 31, 1947 (6 MONTHS)		TOTAL	
Professional personnel:								
Chief of research section	1	$8,000	$ 6,000		$ 4,000		$ 10,000	
Operations supervisor	1	5,000	3,750		2,500		6,250	
Assistants, statistical	3	3,600	8,100		5,400		13,500	
Total				$ 17,850		$ 11,900		$ 29,750
Clerical personnel:								
Machine supervisor	1	3,600	2,700		1,800		4,500	
Coders[2]	39	2,400	70,200		–		139,800	
Coders[2]	58	2,400	–		69,600			
Keypunch operators	2	2,400	3,600		2,400		6,000	
Computers	8	2,400	14,400		9,600		24,000	
Clerk typists	2	2,400	3,600		–		13,200	
Clerk typists	8	2,400	–		9,600			
Total				94,500		93,000		187,500
Total personnel				112,350		104,900		217,250
Rental and equipment:								
Office rent, 4,000 sq. ft.		$3/sq. ft.	9,000		–		18,000	
Office rent, 6,000 sq. ft.		3/sq. ft.	–		9,000			
Machine rental[1]		5,400	2,700		5,100[3]		7,800	
Office equip. and supplies			4,500		2,200		6,700	
Total				16,200		16,300		32,500
GRAND TOTAL				$128,550		$121,200		$249,750

[1]Rental for keypunches, verifiers, sorters, tabulators for six months prior to July 1, 1947, and six months thereafter.

[2]See justification for number of coders on next page.

[3]Represents one additional sorter and one additional tabulator for this period.

*The first part of this report was published in the December, 1946 issue of the JOURNAL (pp. 777-782).

AUDITOR'S STATEMENT

November 15, 1946

To the Executive Board
American Academy of Pediatrics
Evanston, Illinois
Gentlemen:

I have examined the budgets presented by the American Academy of Pediatrics, Study of Child Health Services as of October 31, 1946, for the National Foundation for Infantile Paralysis account, the National Institute of Health account, and the General Academy account.

The amounts represented as having been spent have actually been paid out. The budget estimates seem fair and reasonable and are not excessive viewed in light of past experience and future requirements.

In my opinion the accompanying budgets present fairly the requirements necessary for the fulfillment of the program outlined for the Study of Child Health Services.

Verly truly yours,
MAX R. BYERS
Certified Public Accountant

Washington, D. C.

AMERICAN ACADEMY OF PEDIATRICS STATISTICAL ANALYSES

Budget Estimate for Coders, Oct. 1, 1946, to Dec. 31, 1947

It is estimated that 700 man-months of clerical time will be required for editing, math checking, coding, transcribing, and verifying these processes. To complete half of this work before July 1, 1947 (nine months), and the balance by Dec. 31, 1947 (six months), would require:

39 coders @ 9 months each or 351 man-months, and
58 coders @ 6 months each or 348 man-months
Total 699 man-months

The basis for these estimates is shown below:

SCHEDULE	ESTIMATED NUMBER OF SCHEDULES	NUMBER OF PUNCH CARDS PER SCHEDULE	TIME PER PUNCH CARD
I-A	10,000	3	30
I-D	5,000	4	30
I-E	600	2	30
I-F	500	2	30
I-G	200	2	30
I-H	100	2	30
I-J	100	2	30
II-A	7,000	2	20
II-B	3,500	2	20
II-C	3,500	1	20
II-D	7,000	2	20
II-E	3,500	1	20
11-F	7,000	2	20
II-G	7,000	2	20
III-A	181,000	1	15
III-B	4,000	3	30
III-C	70,000	1	15

BUDGET FOR GENERAL ACADEMY ACCOUNT

Contributions Received for First Year:	
American Academy of Pediatrics Reserve Fund	$18,000.00
Mead Johnson & Company	18,000.00
M & R Dietetic Laboratories, Inc.	10,000.00
Carnation Company	10,000.00
Pet Milk Company	10,000.00
New England Pediatric Society	500.00
Lederle Laboratories	5,000.00
Field Foundation	5,000.00
Cutter Laboratories	500.00
Total Receipts	$77,000.00
Less: Amount expended for Study prior to February, 1946	4,474.16
	$72,525.84

BUDGET FOR GENERAL ACADEMY ACCOUNT (CONT'D)

	BUDGET FIRST YEAR	EXPENDED TO 10/31/46	BALANCE REMAINING	BUDGET SECOND YEAR
Salaries	$18,000.00	$13,238.44	$ 4,761.56	$22,000.00
Travel:				
Executive staff and committee	5,000.00	4,506.31	493.69	5,000.00
Furniture and fixtures	4,000.00	771.77	3,228.23	2,000.00
Postage	1,000.00	189.23	810.77	1,000.00
Office supplies	2,000.00	336.70	1,663.30	1,000.00
Office maintenance	600.00		600.00	2,400.00
Printing	3,000.00	1,501.65	1,498.35	3,000.00
Publicity	1,000.00	326.39	673.61	1,000.00
Committee report:				
Publishing and distribution				5,000.00
Telephone and telegraph	1,000.00	177.62	822.38	1,000.00
Periodicals and books	100.00	33.65	66.35	100.00
Car purchase and travel	2,000.00	2,643.81	643.81	1,000.00
Social Security	400.00	53.84	346.16	400.00
Accounting and legal:				
Accounting and auditing	600.00		600.00	1,800.00
Premium on bonds	400.00	187.50	212.50	400.00
Legal fees	200.00		200.00	200.00
Insurance	100.00		100.00	300.00
Miscellaneous	250.00	184.82	65.18	250.00
State programs	30,000.00	16,870.02	13,129.98	30,000.00
Educational study:				
Field staff	1,000.00		1,000.00	5,000.00
Travel and committee meetings	1,500.00		1,500.00	3,500.00
Totals	$72,150.00	$41,021.75	$31,128.25	$86,350.00

COMMENTS

General Academy Account.—

1. The Field Foundation has made a grant of $10,000 for a two-year period, of which $5,000 has been received. At the time the first payment was received, the following conditions were made by the Field Foundation:

(a) "That the first $5,000 of this Corporation's contribution be applied to the nation-wide Study of Child Health Facilities and Services by states.

(b) "That the second $5,000 of this Corporation's contribution be applied toward the compensation of competent personnel to publicize the results of the survey in the daily press, in magazines, on the radio, and through other channels of public information."

In accordance with these conditions, the first $5,000 already received has been applied against the operating cost of the development and conduct of state programs for the Study of Child Health Services. The second $5,000, to be received during the second year, will be applied in accordance with paragraph (b) above.

2. Expenditures budgeted for the National Foundation Account were met from the General Academy Account prior to the receipt of the grant from the National Foundation.

3. Item 1 (Salaries) on the general Academy budget includes:

The salary of the Director, starting Jan. 1, 1946,
All other salaries prior to the receipt of the grant from the National Foundation for Infantile Paralysis,
Entire statistical pay roll for the month of October, pending the receipt of the NIH grant,
Other personnel of the Administrative Staff not included in the Foundation budget,
Compensation of publicity personnel during the second year in accordance with the conditions of the Field Foundation.

4. Item 8 (Publicity) includes the printing and distribution of progress bulletins, exhibits, etc.

5. Item 16 (State Programs) includes payments advanced to state chairmen in those States where local resources have been inadequate to meet full expenses of state study programs. When the original estimates for state budgets were made, state reports were not anticipated, and hence no provision was included for the cost of their preparation and publication. After reviewing the financial reports of those States which have completed their programs, it is evident that either their finances are completely exhausted or that the remaining balances are too small to meet the cost of their state reports. For this reason the budget of the Central Office for the second year shows an amount of $30,000 to insure that sufficient funds will be in hand to enable all States to prepare satisfactory reports. This item for state programs has resulted in a budgetary deficit of $41,350 which is needed to meet budget requirements over and above the $45,000 pledged for payment in this account during the second year.

Foundation Account.—

1. In order to meet expenditures of the statistical division prior to the receipt of the grant from the National Institute of Health, the National Foundation was requested to allow $10,000 to be taken from Item 6 (Regional Directors) and $2,000 from Item 9 (Office). This request was approved by letter dated June 4, 1946.

2. In order to meet current printing expenses, the National Foundation was requested to allow $3,000 to be taken from Item 6 to be applied against Item 11. This request was approved by letter dated Aug. 19, 1946.

National Institute of Health Account.—

The first payment from the National Institute of Health grant was made on November 1 in the amount of $128,550. Since this amount was budgeted for the period Oct. 1, 1946, to June 30, 1947, permission has been received to make payments from this account in arrears, starting with Oct. 1, 1946. Expenditures to be included from this budget have been met from the General Academy Account and will be refunded to the General Academy Account following the establishment of the NIH Account at the Bankers Trust Company of New York.

RECOMMENDATIONS TO EXECUTIVE BOARD

The Committee for the Study of Child Health Services, at a meeting in Washington, Oct. 1, 1946, unanimously agreed that the following recommendations should be made to the Executive Board of the Academy:

(a) That all factual material arising from the Study of Child Health Services should be released by the American Academy of Pediatrics at both National and State levels.

(b) That the Committee for the Study of Child Health Services is responsible not only for preparing a national report of the factual material but also for submitting to state chairmen tabulated factual data suitable for the preparation of state reports.

(c) The state chairmen together with their advisory committees are responsible for seeing that state reports based upon the tabulated material are written and published as soon as possible. Whereas the national report prepared by the Committee for the Study of Child Health Services will include no recommendations arising from the data, the state reports may and should include recommendations based upon local situations.

(d) That within a period of two months after receipt of the tabulated material, state chairmen should be required to submit to the Committee for the Study of Child Health Services a statement indicating that definite plans have been made to write a state report and a brief description of such plans. If at the end of this two months' period the state chairman has not made satisfactory plans to report the material arising from the Study in his State, the Committee for the Study of Child Health Services is free to release the factual data to any person or group qualified to use it within the State. If the plans for the preparation of the state report are considered by the committee to be satisfactory, then the state chairman should be

allowed an additional period not to exceed four months to complete the state report during which time none of the factual data pertaining to his State should be released to others by the Committee for the Study of Child Health Services except after obtaining approval from the state chairman concerned.

(e) That after a period of six months following the receipt by the state chairmen of the tabulated material, the Committee for the Study of Child Health Services is free to release the tabulated material or punch cards to any person or group qualified to use it.

(f) That a further committee of the Academy should be created which would be responsible for the recommendations arising out of the Study at the National level and for developing from the Study a suitable action program. This committee would also be responsible for reviewing the recommendations contained in state reports, advising in the use of the material in the respective States, but would have no veto power over any recommendations in state reports.

(g) That because of the great importance of the proper implementation of the factual data secured, both at the National and the State level, it is considered necessary that the Academy employ a full-time executive director to direct the use of this material in the States and also at the National level. This executive director should be the executive secretary of the new committee referred to in the paragraph above.

(h) That in the case of North Carolina, the Pilot State, the Committee for the Study of Child Health Services should be responsible not only for the factual report but also for reviewing the recommendations contained therein.

(i) That in publication of State as well as National reports, credit should be given to the United States Public Health Service and the Children's Bureau for the cooperation they have given to the Academy in the Study. Acknowledgment should also be made of contributions or cooperation in the form of services and financial support from other sources.

(j) That after publication of National or State reports the factual material should be available to anyone desiring to use it.

The Report of the Committee on the Study of Child Health Services was approved except for section "g" which was to be acted upon at the meeting of the Executive Board in February at Pittsburgh.

Report of the Committee on School Health

FURTHER COMMENTS UPON STANDARDS FOR SCHOOL MEDICAL EXAMINATIONS

Repeated inquiries regarding standards for medical examinations and school health service have come to the Committee on School Health. These inquiries are difficult to answer satisfactorily because the quality of medical examinations in schools depends so much more upon the number of children to be examined, the time given by the physician, and the conditions under which the physician works, than any set of standards for the examination. Furthermore, there is a tendency to overemphasize the examination and neglect what comes after it.

While the brochure prepared by the Committee on Cooperation with Non-Medical Groups and Societies of the Academy* indicates in a brief and concise manner the minimum standards which the Committee feels should be included in a reasonably thorough health appraisal of a school-aged child, a different approach is needed for the adolescent boy or girl.

However, it must be recognized that under the pressure of waiting parents, the demands of school authorities, or administrative convenience, many short cuts are tolerated so the child may fail to benefit from the physician's full knowledge of the history or enough advice to the parent about behavior problems. Laboratory procedures are usually omitted in school and the chest x-ray which is particularly indicated in high schools, because of the educational opportunities offered by the activity, is only beginning to be accepted as a regular procedure.

*Printed and distributed by Mead Johnson and Company in cooperation with the American Academy of Pediatrics.

In a school situation time is saved by identification data and the vision and hearing test records being prepared by the nurse or teacher, but the time required for a careful history and such explanation to the parent as to insure understanding and cooperation cannot be avoided without serious loss of benefits to many children.

We have, in previous reports, pointed out how the attempt to give annual or too many routine examinations may interfere with the quality of medical judgment, and the time given by the physician in the school is dependent upon the remuneration and the plan of the service. The presence of the parent at the examination takes more time and yet is essential for the history and for interpreting the needs of the child so that the parent is persuaded to obtain service. Many, if not most, parents who can afford private care prefer to obtain the health examination in the private office of their family physician or pediatrician, particularly when the medical profession is alert to the possibilities of health supervsion.

No fixed rule can be applied as to the frequency of medical examinations in school and still maintain an appropriately high quality of medical judgment. Too often the physician does not have enough time to give as much as fifteen or twenty minutes per pupil and parent, and yet double that time may be required to get all the background of a case with special problems and to help the parent, teacher, and nurse understand the problem. Naturally, the larger the proportion of children from the higher economic status homes will respond with more private office examinations and schools with many poor children will require more examinations and more follow-up in school. The decision as to the frequency of the examinations should be a medical decision based upon the budget allowed for medical time, the assistance given to the physician, nursing time for follow-up as well as the socioeconomic status of the children.

Certainly, all children should have an examination on entrance to school and thereafter as often as the teacher and nurse observe signs and symptoms or behavior suggesting a medical problem. More routine examinations should not be attempted unless there is a real prospect that the physician will have time enough without interfering with the quality of this much service. Of course, if staff time enough is available, more routine examinations would be desirable, but we would emphasize the need for study of the cases referred by teachers and nurses and for parent attendance at the examination, because the tendency has so generally been to achieve quantity rather than quality. Furthermore, the referred cases are more likely to be in need of medical attention and a large proportion would not be discovered by routine examinations. Proper encouragement of teachers to observe the conditions needing the medical judgment of the school physician should probably lead to twice as many children referred to the physician as are required for routine examinations on entrance to school. While no adequate evidence is available as to the expected number of children that should be referred by teachers and nurses, there is plenty of evidence* that there is need for such examinations apart from the provision for routine examinations. In giving emphasis to time for study of referred cases, there should be no assumption that complete coverage of all the children at entrance to school should be the only objective for routine examinations. The next step, no doubt, should be to cover all children before leaving school, and the administration of such a service should be responsible for encouraging a larger measure of protection and health service for all children.

As inadequate remuneration and inadequate time so often interfere with the quality of medical judgment and the usefulness of the service, it is well to review briefly some essentials of the physician's service in the school not usually included in estimates of medical time:

1. Time must be provided for the physician to consult with the nurse, principal, and teachers on problems that arise concerning communicable disease as well as to inspect children referred because of suspicion of contagion during the period he is in the school.

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*George M. Wheatley, M.D.: Case finding Procedures Developed by the Astoria School Health Study "The Child," U. S. Children's Bureau, vol. 4, nos. 11 and 12, May and June, 1940.

Dorothy B. Nyswander, Ph.D.: Solving School Health Problems, New York, The Commonwealth Fund.

National Committee on School Health Policies of the National Conference for Cooperation in Health Education: "Suggested School Health Policies," ed. 2., revised, Health Education Council, 10 Downing Street, New York 14, N. Y., pp. 26-28, 1946.

2. Time for diphtheria or immunization and vaccination service, naturally, will vary in different schools and according to community policy.

3. The time necessary to consult with the principal and teachers is dependent upon the resourcefulness of the physician and his understanding of school problems, but there is no doubt about the need of medical advice both on individual children and on curriculum, health teaching, hazards, seating and lighting, ventilation, mental and emotional health, school food service, and many other questions that arise in school.*

4. The medical reports from private and clinic physicians should be reviewed by the school physician and interpreted to the nurse and other members of the school staff, who are concerned.

5. Correspondence or telephone calls with practicing physicians are an essential part of the service of the school physician to correct misunderstandings and to exchange essential information concerning individual children that are known to both the school physician and the practitioner.

6. In any program that provides for the parent to consult with the physician at the time of a school examination, and for the medical appraisal of children referred by the teacher and nurse, there must be planning for the schedule of cases to be seen by the school physician. This requires time for a review of the day's records and advice to the nurse concerning the proper allotment of time for the various activities of the physician's session.

7. Finally, the physician should have time allotted to discuss with the nurse the problems met in the course of her follow-up, to influence the parent to meet the needs of the child. This advice is concerned not only with decisions for release from follow-up but to give the nurse additional information necessary for the education of the parent or a better understanding of the problem, as well as decisions for further observation, re-examination, or further investigation as to home or other environmental conditions.

These seven items have been estimated as requiring at least one-fourth of the physician's time in a well-directed service.†

Other conditions under which the physician works that influence the time requirement include facilities for privacy and disrobing of pupils, the available records of causes of sickness absences, records of vision and hearing tests, height and weight records, teacher observation records, dental service records, and monitor service to send for pupils, waiting room for parents and the assistance of the nurse to report on her knowledge of the case and to insure that all records are available and that she understand the advice to meet the needs.

While it should be obvious that the physician must have time enough to avoid hasty judgments, and pay enough to attract the best ability, good physicians do not want to spend their time on routine work that does not yield experience which contributes to their professional development. The presence of the parent in school offers some interest and challenge to the physician in persuading and educating parents in the health care of their children. He should learn to make parents appreciate the value of advice and supervision of well children. With well-selected referral of children likely to be in need of medical care, he should meet a good number of challenging problems as to the degree of seriousness of adverse conditions discovered by him.

To carry out such a program, the physician must meet a definite weekly schedule of hours throughout the year so that the terms of his employment and remuneration should be computed on the basis of hours needed per week for each school according to the number and economic status of the pupils. To improve this remuneration should benefit the whole profession through improved public relations and public education. The pay for Veterans Administration service should immediately influence the pay for school physicians. To meet the variations in different parts of the country it is suggested that the physician should be paid at a rate for each hour of service at least equal to the average for an office visit to a qualified pediatrician in the community.

*Op. cit. pp. 11 to 33. "Educational Qualifications of School Physicians," American Journal of Public Health, vol. 34, no. 9, 1944.

†Unpublished paper presented at Joint Session of the School Health and Vital Statistics Sections of the American Public Health Association Meeting in New York, October 4, 1944.

In order to offset the routine character of part of the work, to improve the service, and to extend postgraduate medical education, the time schedule should also provide for such in-service training by competent clinical instructors as will improve the knowledge of the physician in those special fields of medicine concerned with problems common to school age children. Groups of children selected by the school physician should provide excellent teaching material for clinical instruction by the pediatrician, the cardiologist, the orthopedist, the otologist, the ophthalmologist or the child psychiatrist. The dentist and dermatologist may also participate to advantage. The best way to advise parents, nurse and teachers as to the needs of children is a subject for round-table discussion that can not only benefit the school program but the quality of health education by the physicians in their private practice. The scope of problems presented by children in school offers a field for clinical teaching of preventive pediatrics not generally used, but the screening by teachers and nurses and, in turn, by the school physician should reveal such a selection of cases as to indicate new opportunities and a new interest in the whole child. Consultation services of specialists would not only increase the interest of the physician but insure sound advice for guidance of the parent in the use of the community medical services.

Just as pediatricians demonstrated new possibilities for service to children in the schools of a generation ago, so today they may demonstrate a broader field of service by postgraduate medical education for young physicians who work in the schools. With part-time employment and limited tenure of school physicians this contribution to improved health service should eventually be available to all physicians who serve children.

Respectfully submitted,
HAROLD H. MITCHELL, Chairman
ROCKWELL M. KEMPTON
A. CLEMENT SILVERMAN
ARTHUR E. WADE
ESTELLE F. WARNER
GEORGE M. WHEATLEY

The report of the Committee on School Health by Harold H. Mitchell was accepted and Dr. Mitchell was congratulated upon the excellence of his report. His suggestion that we cooperate with the National Conference for Cooperation in Health Education through a liaison officer was accepted and he was appointed liaison officer to that group.

After consultation with Mr. William F. Kirk of the Hotel William Penn, and Mr. Adolph O. Frey of the Pittsburgh Chamber of Commerce, it was decided to hold the Annual Meeting Feb. 24 to 27, 1947, at the Hotel William Penn.

Report of the Committee on Contact Infections

The committee does not feel it feasible to undertake large scale investigation of ultraviolet air sterilization in institutions.

Respectfully submitted,
REGINALD A. HIGGONS, Chairman
GAYLORD W. GRAVES
PARK J. WHITE

The report was accepted.

Report of the Committee on Fetus and Newborn

The present committee, having recently been appointed, has been unable as yet to meet and undertake a program.

The committee plans to meet in Pittsburgh and is anxious to undertake a vigorous program directed toward a general reduction in fetal and neonatal mortality.

The committee wishes to remind the members of the Academy that it is anxious to receive questions or suggestions from the members.

Respectfully submitted,
STEWART H. CLIFFORD, Chairman
NINA A. ANDERSON
ETHEL C. DUNHAM
JOHN C. MONTGOMERY
HOWARD J. MORRISON
MILTON J. E. SENN
CHARLES A. WEYMULLER

The report was accepted.

Report of the Committee on Governmental and Medical Agencies

The committee has held no meeting since the June report, but will hold a meeting on Thursday, Nov. 14, 1946, at Pittsburgh on the following agenda, which it is proposed that the committee carry out during the coming year.

1. Reactivation of forty-eight state committees and their state programs.
2. Report on Advisory Aid to Bureau of Food and Drugs, Federal Security Administration (Dr. Harrold Murray).
3. Implementation of Academy-approved national program.
4. A winter conference in New York or Washington of our Committee, with its conference members from the American Medical Association, United States Public Health Service, Children's Bureau, and invited guests, to discuss "National planning and standards for good pediatric medical care for all children in the United States, with particular consideration of children in families unable to pay for medical services, to the end that the standards of medical care may be maintained at a high level among such groups."

Note: Members of the committee are urged to give serious study to this key problem of how "standards of pediatric medical care may be maintained at a high level among those groups unable to pay for medical services," in accordance with the resolution herein quoted, adopted by the Academy in Detroit in January, 1946.

It is our desire that the committee initiate a conference study, by governmental and medical agencies, of specific factors influencing standards of quality of pediatric medical care, and thus make a constructive contribution to the Academy's Child Health objective of better child health, by focusing attention on the kind of pediatric care which now obtains in the various forms of child health services now available. The cooperative conference study by governmental and medical agencies might well serve to clarify our thinking and planning and aid in bringing all concerned with child health to constructive action on whatever "areas of agreement" as may be reached, because all of us wish good quality pediatric medical care in all types of child health services.

The splendid cooperation of governmental and medical agencies, national and state, now being shown in the monumental study of Child Health Services, is laying a sound foundation for continued teamwork when the study is finished. It will be the desire of our committee, strengthened in 1946 by the addition of two of the best pediatric brains in the country, to supplement the Academy's fact-finding study by our conference committee's studies of what should be the standards of pediatric medical care which would maintain high quality in all present kinds of child health services.

Respectfully submitted,
STANLEY H. NICHOLS, Chairman
PAUL W. BEAVEN
W. L. CRAWFORD
WILBERT C. DAVISON
ALEXANDER T. MARTIN
HARROLD A. MURRAY
OSCAR REISS
A. L. VAN HORN
JOSEPH S. WALL

The report of the Committee on Governmental and Medical Agencies was accepted, and Stanley Nichols was asked to defer action until such time as the matters in dispute could be referred to the proper committee of the Academy which was to be appointed.

Report of the Committee on Legislation

The membership of the Academy is familiar with the fact that the year 1946 has been characterized by a plethora of legislative proposals concerning medical care.

Of the several bills introduced and under committee consideration by Congress, one was enacted and signed by the President, S.191, the Hill-Burton Bill. The initial phases of State surveys as to hospital and health center needs will shortly be undertaken under the jurisdiction of the United States Public Health Service.

S.2143, the Taft-Smith-Ball Bill, did not reach the stage of hearings during this session of the Congress. Its conservative provisions have met with considerable support from members of the medical profession who approve of its principles and urge its further study.

On May 31, 1946, the Chairman of the Committee on Legislation was finally permitted to testify before the Senate Committee on Education and Labor holding hearing on S.1606 (the Wagner-Murray-Dingell Bill) and to present a statement for the record.

The report of the Legislative Committee to the Executive Board upon the occasion of its June 7 meeting has been published in the September number of the JOURNAL OF PEDIATRICS, pages 387 to 397 and needs no repetition here, as this report summarizes committee activities up to that date.

No doubt sensing the failure to secure passage of S.1606 before the adjournment of Congress, a desperate last-minute attempt by the proponents of this type of legislation was made in early June by shifting hearings to the House side of Congress in order to obtain, if possible, favorable action on S.1318, introduced by Senator Pepper and associates, but for political reasons also introduced in the lower house by four or five cosponsors.

On June 7, the chairman of the Committee on Legislation testified before the House of Representatives Committee on Labor, Subcommittee on Aid to the Physically Handicapped under the chairmanship of Congressman Augustine B. Kelly, the chairman being the only member of the House committee present, although a favorable report was ultimately made recommending the passage of H.R.3922 (identical with S.1318) after most perfunctory hearings lasting but a few hours, which gave no opportunity to hear from but a handful of witnesses.

On June 18, Senator Pepper suddenly promulgated hearings by the Senate Committee on Education and Labor on his own bill, S.1318, having sent out a flood of telegrams urging the friends and supporters of this legislation to march on to Washington like a veritable "bonus army," analogy not without some basis of truth!

Your chairman appeared before this hearing on behalf of the Academy and the American Medical Association at the latter's request. The testimony presented by witness together with supporting written statements forms a book of some 391 pages titled *Maternal and Child Welfare; Hearings before the Committee on Education and Labor, United States Senate, Seventy-ninth Congress, Second Session, on S.1318.* A copy may be obtained by writing to the Chairman, Honorable James E. Murray, or from your respective State Senators.

Efforts to secure enactment of S.1606 and S.1318 were abandoned in early July. Senator Pepper's Subcommittee on Health and Education was also dissolved by Congress on June 29.

As reported in the *New York Times* of July 16, 1946, to quote: "The Senate Education and Labor Committee sidetracked plans for substantial changes in child welfare laws July 15 and voted instead to attempt merely to increase funds for these services. The committee delegated Senators Pepper and Taft to confer with Senator Walter F. George, Chairman of the Finance Committee, on a resolution for the money."

In accordance with this directive, Senators Pepper and Taft introduced Joint Resolution No. 177 to effect increase in funds allotted to maternal and child health and welfare services under the present Title V of the Social Security Act. The amended Social Security Act, passed by the Congress on August 2 and signed by the President on August 10, almost

doubles the existing funds carried under Title V, a break-down showing an increase of the total annual authorization for maternal and child health services from $5,820,000 to $11,000,000 and for crippled children from $3,870,000 to $7,500,00. The total amounts annually authorized for each program are equally divided between funds A and B, and as a result the proportion of the total which must be matched is considerably less than the proportion under the previous authorizations. For the fiscal year 1947, the Congress appropriated $1,660,000 MCH Fund A; $3,520,000 MCH Fund B; $880,000 Crippled Children's Fund A; and $2,750,000 Crippled Children's Fund B, in addition to the amounts previously appropriated for the current fiscal year.

In lieu, therefor, of the radical changes proposed under legislation introduced in the 79 Congress, that body enacted legislation along the lines advanced and advocated by the Academy in its resolutions adopted at the Detroit meeting in January, 1946, namely: "Pending the completion of this study (Study of Child Health Services), it is recognized that urgent needs exist in some States that should be met in the immediate future. To this end the Academy recommends that additional Federal funds be made available for grants-in-aid to the States under existing Maternal and Child Health and Crippled Children's programs of Title V of the Social Security Act, as amended in 1939."

In furtherance of this policy of the Academy, the chairman of the Committee on Legislation addressed a communication to the Honorable Robert L. Doughton, Chairman of the House Ways and Means Committee which had under consideration amendments to the Social Security Act. (See JOURNAL OF PEDIATRICS, September, 1946, p. 396.)

During cross-examination by Senator Pepper at the Senate hearings on S.1318, your chairman on legislation took occasion to urge upon the Senator the same line of approach as advocated by the Academy resolution quoted through a process of gentle "needling," having already experienced considerable needling himself at the hands of the Senator! The following passage-at-arms took place: (Senate hearings, page 84).

> SENATOR PEPPER.—And you ought to be here begging us for funds that in any way whatever could be made available to provide for the children and the children-bearing mothers of this country. I think it does a disservice to your profession for you gentlemen to object or obstruct in any way the provisions of money that would help innocent children to live when otherwise they will die. I thank you very much.
>
> DR. WALL.—We are begging it, Senator, and we are asking for extension of the Social Security Act for the very purposes which you now state, and I hope when that comes before the Senate, you will give it your support so that the Children's Bureau may be enabled to have more funds under Title V of the Social Security Act to care for the needs of those in need.

The Committee on Legislation would strongly urge that the proposal made by President Durand in his report to the Executive Board in June last be adopted by the Academy. Dr. Durand in speaking of the far-reaching results of the child health survey states: "I would suggest that a post-survey planning committee be named at our next meeting."

This suggestion was thoroughly discussed at a meeting of the survey committee in Washington on September 30 and October 1 and strongly supported by President-Elect Lee Forrest Hill. The consensus of the survey committee was quite unanimous that such a committee be named, not only to activate and implement the work of the survey, but to include in its functions advice and recommendations to the Executive Board and to the Academy as to the general policies of our organization, some of which by their very scope and extent prohibit detailed consideration at the busy semiannual meetings of the Board and at the annual meeting of the membership. "Policy Committee" waa suggested as the title of such a committee.

The Committee on Legislation would also urge the formation of such a committee which would relieve our committee of the task of formulating the thought and opinion of the Academy on proposed legislation, which it now endeavors to interpret under the guidance of Academy discussions and expressions of views from the Executive Board.

A few members of the Academy—it must be emphasized that the word "few" is appropriate—have, through the written word and by oral statements, actually "out-Wallaced Wallace" in an effort to sabotage the efforts of the Legislative Committee to present to the best of their ability the policies of the Academy of Pediatrics. Should our committee, whose function it is to further or disapprove at the behest of the Academy matters of legislation pending in Congress, have the authority behind it of the opinions of a Policy Committee, the advice of which has in sequence been endorsed by the Executive Board and the Academy, our lot would not only be a happier one but the voice of the Committee on Legislation would be further strengthened.

In conclusion, I would express on behalf of the committee its deep appreciation of the cooperation of the state chairmen and of many of our members in the work at hand.

Respectfully submitted,
JOSEPH S. WALL, Chairman
W. L. CRAWFORD
HARVEY F. GARRISON
FRANK VAN SCHOICK

The report of the Committee on Legislation as given in person by Joseph S. Wall was accepted.

Report of the Program Committee

The Program Committee's work for the past year, as usual, consisted of the preparation of the program for the annual meeting. How successful it has been will be determined by the reaction of the membership to the program at the annual meeting.

Looking to the future, should the proposed redistricting become a fact, it is suggested that the spring meeting be largely devoted to the presentation of papers by members and others as has been the custom at regional meetings in the past. To arrange this type of program will require the cooperation of the membership in suggesting subjects and speakers.

Respectfully submitted,
EDGAR E. MARTMER, Chairman
FRANK H. DOUGLASS
R. CANNON ELEY
M. HINES ROBERTS
MATTHEW WINTERS

The report was accepted.

A Committee for Improvement of Child Health was voted largely for the purpose of interpreting the findings of the Child Health Survey but also to act as a policy committee to which questions of policy of the Academy could be referred. The committee consists of the following who were appointed by the President: James L. Wilson, Ann Arbor, Mich., Chairman; Arthur H. London, Jr., Durham, N. C.; Roger, L. J. Kennedy, Rochester, Minn.; Clarence H. Webb, Shreveport, La.; H. G. Poncher, Chicago, Ill.; Hulda Thelander, San Francisco, Calif.; Grover F. Powers, New Haven, Conn.; George M. Wheatley, New York, N. Y.; and Warren R. Sisson, Boston, Mass.

The question of the Pan-American Congress of Pediatrics was discussed extensively and plans were made for the cooperation of the various elements of the Academy in the promotion of this meeting.

Report of the Committee on Geographical Distribution of Pediatricians

The Committee on Geographical Distribution has been busy in a desultory way during the summer months. There are a few local surveys that are being completed to meet several requests that have come in, and I have written to several men to give them information which they have requested.

I am revising my survey of the Academy of Pediatrics to bring it up to date. I am also busy with maps to fit the proposed changes of regions of the Academy.

Respectfully submitted,
OTTO L. GOEHLE, Chairman

The report was accepted.

Report of the Committee on Rheumatic Fever

Your committee, although holding no formal meeting since the Detroit session last year, has been actively engaged and has completed a revision of the statement, "Rheumatic Fever and the School Child." This is intended as a guide for school health authorities and is a combined contribution on the part of the Committee on School Health and the Committee on Rheumatic Fever. Emphasis has been placed on the diagnosis of rheumatic fever and not, as now exists, merely on the diagnosis of heart disease. The two committees feel strongly that the school offers an opportunity unparalleled for any other disease to provide the means for a frontal attack on rheumatic fever, and it is here that emphasis should be placed. They recommend: (1) that the school medical examination be improved to aid in more accurate recognition and supervision of children with rheumatic fever; (2) that more emphasis be placed on referral by teachers and nurses for medical review of pupils believed to be below par; (3) that less emphasis be placed on restricting the physical activity of rheumatic children and more attention given to daily observation of pupils for signs or conditions suggestive of rheumatic disease; (4) that there be available to school health services diagnostic and consultation service to aid in the diagnosis of rheumatic fever; and (5) that these services be developed in cooperation with and utilization made of existing medical and public health resources in the community.

Your Committee is now represented by three of its members on the American Council on Rheumatic Fever and has, through the Child Welfare Committee of the American Legion, stressed the importance of rheumatic fever as a public health problem. Two Research Fellowships established by the Legion have already been awarded. Several members of your Committee are members of the Advisory Committee for the Children's Bureau, and have attended meetings in Washington in May and September to discuss mutual problems. Rheumatic Fever programs have been set up in twenty states and more will be inaugurated as qualified personnel are available and standards met. The Academy Fellowship should again be reminded that it was through a recommendation of the Academy some eight years ago that children with rheumatic heart disease should be considered cripples and should, therefore, participate in funds allocated for crippled children under the Social Security Act. The program since that day has gone far in the care of these children and the Academy has played an important part in it.

Future objectives of your Committee are evaluation studies of programs already in operation for five years or more, studies in community planning and the setting up of registries in certain counties. The Academy's Child Health Study should provide, when completed, important information and valuable data for the future guidance of your committee, from which, it is hoped, that recommendations can be made.

Respectfully submitted,
ALEXANDER T. MARTIN, Chairman
STANLEY GIBSON
JOHN P. HUBBARD
HUGH MCCULLOCH
EUGENE H. SMITH
R. R. STRUTHERS
GEORGE M. WHEATLEY

The report of the Committee on Rheumatic Fever was accepted. Following the resignation of Alexander T. Martin, George M. Wheatley was appointed chairman of this committee.

Report of the Committee on National Defense

The activities of the Committee on National Defense have been devoted entirely to the medical supervision of war orphans in cooperation with the United States Committee for the Care of the European Children.

This work had declined sharply since the earlier war period, but in May of this year we were notified that larger groups of children would enter this country under President Truman's directive of Dec. 23, 1945. Dr. Philip Stimson of our committee addressed the Pediatric Section of the New York Academy of Medicine with the object of obtaining a panel of Pediatricians to examine and care for these children, and the response was excellent.

The first children arrived in this country on May 20, 1946, and were admitted at two reception centers in the Borough of the Bronx. Between this time and July 27, seven groups totaling 265 children were examined. The children who entered the country this year differed radically from those of preceding years, since they now included those who had been liberated from concentration camps. It was obvious that the approach to the examinations and their conduct required more tact and patient understanding than with youngsters in the earlier groups. Every religious faith and all nationalities were represented.

Fortunately, many of the physicians were foreign born and could communicate with the children in their own language. Tuberculin and Schick tests could be carried out only after preparing the children and setting their minds at ease. In their past the hypodermic needle had been identified with pain, torture, experimentation, and extermination. Although examinations were limited to essentials, the aim was to be as thorough as possible because it was felt that ours was the responsibility for detecting serious abnormalities before the children made wide contacts in this country. For instance, of the 265 children, 145 had positive tuberculin reactions.

The variety of problems presented to the counseling staff and to the examining physicians resulted from the unusual experiences of these children. The only ones to survive the concentration camps were those who were told enough to work or clever enough to falsify their age or both. The case histories of the children are strikingly similar: Younger brothers and sisters, with their parents were killed—shot and gassed; the boys and girls have worked in munitions factories and coal mines at hard physical labor. They were old enough to be useful and to employ their wits to their best advantage. Though most of them had been in several of such infamous concentration camps as Dachau, Buchenwald, Theresienstadt, and Bergen-Belsen, a few had been in hiding for a while, until they too finally were apprehended. Obviously, only the physically fit and mentally alert survived. The inhuman and barbarous treatment to which these unfortunate children were subjected is beyond belief. The assortment of tortures that were practiced on them will remain indelibly seared in their minds and bodies and prove more lasting than the row of figures which had been burned into their flesh. The representatives of the "master race" for instance employed one child as a human target. Some children were mutilated in torture camps; one of the handsomest wears a very ugly red scar on his neck and face from the day when Nazis set a dog on him. One child survived experimental partial extirpation of the thyroid gland. Teeth constitute a special problem for most of the children. Almost all of them had at least one front tooth missing.

I am happy to report that whenever medical help was required it was readily obtainable; it was never questioned, and cooperation was always wholehearted. The pediatricians who made the routine examinations were always available for every medical contingency until the children left the Reception Center for other parts of the country. The service was entirely voluntary. We have gone beyond the membership of the American Academy of Pediatrics to obtain the services of specialists in various fields. Two roentgenologists, Drs. Sielman and Taterka have been x-raying children who were tuberculin positive; Dr. Eli H. Rubin has been consulted in the interpretation of chest roentgenograms; Dr. J. Burstan for electrocardiograms; and Dr. Jack Wolf in dermatological problems. More recently Dr. Walter Levy has been supervising the examinations and has been responsible for organizing teams of physicians

with the arrival of each new group. The following physicians have participated in this project and have been most cooperative: G. Alpert, J. B. Alter, Blazenstein, M. Blume, L. Budanz, Cohen, B. Denzer, A. Goldfarb, N. Gottschalck, L. Greenspan, N. M. Greenstein, H. Heidenheim, Landsmann, M. Loewy, Pasachoff, Prince, Robinson, G. Rook, A. Schwartz, Schweig, E. Siegel, Steinberg, S. Stone, Waltuch, H. Zweig.

The New York City Health Department has contributed freely of its facilities. The dispensary of the Lebanon Hospital which is near the Reception Center has provided generous assistance and in addition children have been cared for at the Morrisania Hospital, Lenox Hill, Willard Parker, and Beekman Street Hospitals.

Since completing this report, two additional groups of children have arrived in this country and their examinations are now being completed. It is possible that the data derived from the examinations may ultimately prove interesting and valuable should these children continue to arrive in increasing numbers.

Respectfully submitted,

CARL H. SMITH, Chairman
ROBERT A. BIER
CARL H. LAWS
RUSTIN MCINTOSH
DOUGLAS D. MARTIN
LENDON SNEDEKER
PHILIP M. STIMSON
JOSEPH STOKES, JR.

The report was accepted and the committee continued.

Report of the Committee on Postwar Courses in Pediatrics

Total number desiring refresher courses	24
Total number desiring residencies	225
Total	249
Number desiring refresher courses but have not been heard from	10
Number desiring residencies but have not been heard from	88
Total	98
Number desiring refresher courses on active list	14
Number desiring residencies on active list	137
Total	151

140 men have been placed in residencies.

26 men have been placed in refresher courses.

On Sept. 16, 1946, we circularized sixty hospitals. Forty-two hospitals have been heard from, offering a total of forty positions for 1947 and 1948. We have not circularized the hospitals for refresher courses as the demand is very small and the A. M. A. Journal has been publishing a sufficient list of postgraduate courses.

At the beginning of each month we try to publish a list of residencies and send this list to each man on our list. At the present time we have thirty-five men on our active list with whom we correspond continuously. We are trying to get these men placed and it is a difficult job. We sincerely hope that if any positions are open, we will be notified of them so that we may help these veterans find their places in pediatrics.

Respectfully submitted,
CLIFFORD G. GRULEE, Administrator

The report was accepted.

Report of the Committee on Tumor Registry

A meeting of the committee was held Sept. 25, 1946.

A preliminary report of the cases in the registry was made at the Round Table on Tumors, Benign and Malignant, at the Pittsburgh meeting, Nov. 13 to 16, 1946.

Registration and Consultation.—As of July 1, 1946, there were records of 573 cases of malignant tumors under investigation.

Seven new cases have been received for registration or consultation from sources other than Memorial Hospital since the April 29, 1946, report of this committee. The diagnoses were: malignant teratoma, liver; sarcoma, abdominal wall; osteoid osteoma; polycystic kidney; "fatigue" fracture; tuberculosis, osseous; constitutional inferiority.

The Children's Tumor Registry Exhibit has been completed. It was shown at the New York Academy of Medicine Graduate Fortnite on Tumor Oct. 7 to 18, 1946, and at the convention of the American Academy of Pediatrics, Pittsburgh, Pa., Nov. 13 to 16, 1946. An outline to accompany this exhibit explaining the purpose and procedures of the Registry has been prepared.

Education.—In accordance with the authorization of the Executive committee, June 12, 1946, a request was made of the Children's Bureau, of the United States Department of Labor to include a paragraph on the subject of Children's Tumors in that department's publications, *Infant Care* and *Your Child from One to Six.* A reply was received from Marion M. Crane, M.D., Assistant Director, Division of Research in Child Development on June 25, 1946, as follows:

> Your letter of June 20th to Dr. Eliot has arrived while she is in New York acting as Vice-Chairman of the American Delegation to the International Health Conference. It will be called to her attention upon her return.
>
> In the meantime I can assure you that in the next revisions of the Children's Bureau publications *Infant Care* and *Your Child from One to Six* the inclusion of paragraphs on the subject of neoplasms will be given full consideration in the light of the recommendations of the Academy and of the very interesting statistics that you have sent us.
>
> It happens that both of these booklets have been completely revised quite recently, so it may not be possible to insert the additional material as soon as we would wish to.
>
> The Children's Bureau is always glad to receive suggestions from the Academy as to ways in which we can make our publications more useful.

Several interviews were held with officers of the American Cancer Society. This national organization plans to include data from this Registry relating to children in their program of medical and lay education.

The following material is now available for graduate and undergraduate medical education and lay groups interested in the field of child health: children's tumor exhibit, statistical data, charts, and photographs.

This committee believes the facilities of the Registry would be further utilized by the medical profession if its existence were more widely known. It is recommended that the title and the address of the Registry be included (as formerly) in the JOURNAL OF PEDIATRICS on the page with the names of the Officers of the American Academy of Pediatrics.

Respectfully submitted,
HAROLD W. DARGEON, Chairman
HERBERT F. JACKSON
HAYES MARTIN

The report was accepted.

Report of the American Board of Pediatrics

The members of the American Board of Pediatrics appointed by the American Academy of Pediatrics submit the following report of the work of this Board from Jan. 1, 1946, to Oct. 1, 1946.

During the spring and summer of this year we have held two oral examinations as follows: Cleveland, Ohio, April 27 and 28, 1946, and San Francisco, Calif., July 6 and 7, 1946. The mortality for the two examinations was 25.7 per cent which is 5.6 per cent lower than the mortality from October 1944 to January, 1946. This is a total drop of 18 per cent in the mortality since October, 1944, and we hope this will continue.

As you will notice, the Office of the Secretary has changed its address again and is now located at 1818 Twelfth Street, Des Moines, Iowa, and the telephone is 2-1572, listed under the name of Jerry O. Younglove. We hope this will be the last move for some time.

Because of difficulty with the engravers, our first Certificates in Allergy will not be issued until about October 15, but we hope to go along with this at a more rapid rate in the future.

Proof has been received from the A. N. Marquis Company on the Directory for Medical Specialists and we understand this is going to be off the press soon. We are attempting to obtain reprints of the geographical lists of the licentiates of this Board for distribution to licentiates, hospitals, and teaching institutions, but have had no definite word on this.

There has been no change in the personnel of this board, but Dr. D. J. McCune was re-elected to membership by the American Pediatric Society for a period of six years.

The committee set up to consider the special cases of returning veterans is still functioning. We are, also, cooperating with the Council on Medical Education and Hospitals of the A. M. A. in extending temporary approval to hospitals for residency training, pending official inspection by the Council. We hope this will make more training positions available to veterans in a short space of time.

Since our last report, the application fee for the examinations in pediatrics has been raised from $75.00 to $100.00, effective May 1, 1946. This may have to be increased even more in the future due to the high price of securing adequate secretarial help that is so necessary since the volume of correspondence and work has far exceeded anything we have ever anticipated.

Dates of the spring oral examinations have not been set. We are holding two oral examinations this fall; the first in Pittsburgh on November 10, 11, and 12, 1946, immediately preceding the Annual Meeting of the American Academy of Pediatrics, and the second in Boston on December 13, 14, and 15, 1946.

Respectfully submitted,
LEE F. HILL
HUGH MCCULLOCH
HAROLD C. STUART

The report was accepted.

No reports were received from the following:
Committee on Honorary Fellows
Committee on Hospitals and Dispensaries
Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases
Committee on Medical Education
Committee on Nursing Education
Committee on Pan-American Scholarships
Committee on Pediatric Awards
Committee on Mothers' Milk Bureaus
Committee on Nutrition

Report of the Committee on Cooperation With Nonmedical Groups

The Committee has been assembling data from its members and some state chairmen on methods of contacting lay groups interested in child care problems. The Medical Advisory Committee of the National Girl Scouts has submitted a brochure on "Directions to Camp Leaders" for review and suggestions in order to obtain the approval of the Academy. This has been revised by the committee and will be submitted to the Executive Committee of the Academy.

A second printing with a few revisions has been made of the Academy's camp card. Over 100,000 cards have been printed. An attempt will be made in the spring to put them in the hands of all pediatricians in order to standardize the camp examination.

At present the script "When Bobby Goes to School" is being revised to bring this picture up to date. During the last year there has been an increasing demand to show this picture.

Several national organizations interested in children have submitted questions to the committee which have been answered by the chairman.

Respectfully submitted,
ALBERT D. KAISER, Chairman
ROGER L. J. KENNEDY
MARVIN ISRAEL
JOSEPH I. LINDE
MARGARET NICHOLSON
JAMES C. OVERALL
WARREN R. SISSON
LILLIAN R. SMITH
EDWIN T. WYMAN

The report of the Committee on Cooperation with Nonmedical Groups was made by Albert D. Kaiser in Person with Mr. A. L. Rose present. There was some discussion of revising the film "When Bobby Goes to School," also of the Health Examination cards and their distribution, as well as cooperation with several different organizations such as the Girl Scouts and the Boy Scouts. The committee report was accepted.

Report of the Committee on Mental Health

Arrangements have been practically completed for the production of the motion picture on mental growth during the first two years. We hope it will be completed within six months.

Respectfully submitted,
BERT I. BEVERLY, Chairman
C. ANDERSON ALDRICH
FREDERICK H. ALLEN
BRONSON CROTHERS
GEORGE J. MOHR
ARTHUR H. PARMELEE
VICTOR E. STORK

The report of the Committee on Mental Health was discussed at length by Bert I. Beverly, and Mr. Heineman and Mr. Papineau of Pet Milk Company. It was decided to urge that company to complete the film which has been developed under the direction of the Committee on Mental Health. The report was accepted.

Report of the Committee on a Library and Museum of Pediatrics

The committee on establishing a pediatric library and museum has been stimulated by the offer of fifteen thousand ($15,000.00) dollars by Mead Johnson & Company to start a building fund to house such a project.

At the present, the committee is exploring the field of libraries in an effort to learn how such a library can best serve the Academy and pediatricians.

It welcomes suggestions from members as to the need for such a library and how such needs can best be met.

The establishment of such a library is an undertaking of considerable magnitude, and the committee wishes to be fully informed before making recommendations to the Executive Board and the membership of the Academy.

Respectfully submitted,
EDGAR E. MARTMER, Chairman
ALBERT D. KAISER
HUGH MCCULLOCH

The Committee on a Library and Museum of Pediatrics was reported on by Dr. Edgar E. Martmer and after some discussion it was decided that the Executive Board approves having a permanent home and library, the funds to be raised in any manner possible and that Dr. Martmer be given a sum not to exceed $500.00 to cover initial investigation. A generous offer with respect to the funding of such a building was received from Mr. Rose of Mead Johnson and Company.

Dr. Hill brought up the question of representation of pediatricians on the Committees of the National Institute of Health. There are apparently sixteen different groups and not a single pediatrician on any group. Dr. Hill was empowered to write a letter in the name of the Academy requesting representation.

The question of pending legislation at the National level was discussed by Mr. Thomas Hendricks, Secretary of the Council on Medical Service of the A. M. A. and Mrs. Shuler, Supervisor of the Bureau of Information of the A. M. A., in some detail. Dr. Wall joined in in this discussion as did some members of the Executive Board. It was decided to approach the House of Delegates and ask them to give their approval to an expressed desire for cooperation between the A. M. A., and the American Academy of Pediatrics on legislation affecting the children in this country. It was voted that the Executive Board would be pleased to have one of its representatives present at the meeting which is held with representatives of the A. M. A. and Senator Taft and his group to make available what information the Academy may have on child care for the use of the Senatorial Group.

Report of the Committee on Cooperation With the American Legion

Efforts are being made to further the liaison work with the American Legion along two lines: (1) reorganize the personnel of the Academy who are assigned to this liaison work in such a manner that each state will have an active and energetic state liaison officer who will work in close cooperation with the American Legion child welfare representative of the state, and (2) formulate a practical program for future activity.

With regard to the first objective, reorganization of personnel involved in this work, a list is being obtained of the American Academy of Pediatrics members who were in the armed services during this war. An attempt will be made to interest as many of these men as possible in the various states to assume the duties of state liaison officers. Sixty per cent of the membership of the American Legion is now composed of veterans of World War II. It is felt that the younger members of the Academy should participate more actively in the work of the Academy. In addition, it is felt advisable that Academy veterans of this war be associated with the work of the present Regional Liaison Officers. In summary, the first step should be the careful and complete reorganization of personnel so that men who are actively interested in furthering this work will be appointed to the various positions, and those who either do not have enough time to do the work or who are not interested in it sufficiently can be dropped.

With regard to formulating a program for the future, the undersigned held a meeting with the Director of the National Child Welfare Division of the American Legion and her assistants in Indianapolis on September 15. A most satisfactory conference was achieved. On the night of September 15, another conference was held with the same personnel. Dr. Edward Clay Mitchell, of Memphis, Honorary Chief Liaison Officer, was present at the second meeting and contributed materially to the development of ideas for a future program. Mr. Jack Cann, editor of *The Legionnaire*, was present at the second conference and promised to publish in this paper, which is mailed to the homes of 3,750,000 legionnaires throughout the country, a series of articles on child welfare and health which are to be written by outstanding pediatricians of the country. The titles of the articles to be written and the names of the men who are to be requested to write these articles are now under consideration and will be taken up at the National meeting in Pittsburgh in November. The articles will be less than 1,500 words long, written for lay persons, and will emphasize important aspects of

child welfare and health. Several other possible projects were discussed, but it was decided to do one thing at a time and to concentrate on the production of these articles, which were promised in the past but have not been delivered.

It is worth emphasizing that the American Legion is a very powerful national organization with a membership of 3,750,000, that it has a very able and active director of the National Child Welfare Division, that it has the necessary financial backing to be of great assistance in the improvement of child welfare throughout the country, and that the child welfare personnel in the national office of the legion is very congenial and friendly toward the American Academy of Pediatrics. From these facts it would appear that a rare opportunity exists for the American Academy of Pediatrics, working with the child welfare division of the American Legion, to achieve a great deal of good for the children of America. Northing worth while can possibly be obtained along these lines unless the members of the Academy of Pediatrics who are requested to help in this work do so with enthusiasm and interest and carry out their responsibilities in the most effective manner.

Respectfully submitted,

JAMES G. HUGHES, Chairman and Chief Liaison Officer
EDWARD C. MITCHELL, Honorary Chief Liaison Officer
LAWRENCE F. RICHDORF, Associate Liaison Officer
EDWIN T. WYMAN, Area A Liaison Officer
PRESTON A. MCLENDON, Area B Liaison Officer
GEORGE M. LYON, Area C Liaison Officer
JULIUS H. HESS, Area D Liaison Officer
CLIFFORD SWEET, Area E Liaison Officer

The report of the Committee on Cooperation with the American Legion was given by James G. Hughes in person. This report was accepted and after much discussion Dr. Hughes was asked to formulate ideas for further cooperation with the American Legion and to present them later to the Executive Board. It was moved and carried that the Academy request that a pediatrician be put on the Medical Advisory Committee of the American Legion.

Report of the Nominating Committee

Recommendations.—

For Vice-President (President-elect):
John A. Toomey, Cleveland, Ohio

If the redistricting is *not* passed by the members:
For Chairman of Region IV:
Vernon W. Spickard, Seattle, Washington

If the redistricting *is* passed by the members:
For District I, Oliver L. Stringfield, Stamford, Conn. (1 year).
For District II, Paul W. Beaven, Rochester, N. Y. (2 years).
For District III, Philip S. Barba, Philadelphia, Pa. (3 years).
For District IV, Warren W. Quillian, Miami (Coral Gables), Fla. (1 year).
For District V, James W. Bruce, Louisville, Ky. (2 years).
For District VI, George F. Munns, Winnetka, Ill. (3 years).
For District VII, Thomas J. McElhenney, Austin, Tex. (1 year).
For District VIII, Vernon W. Spickard, Seattle, Wash. (2 years).
For District IX, The representative will be determined by a vote of the Latin-American members at the meeting of the Pan-American Congress in Washington, July 10 to 13, 1947 (3 years).

Respectfully submitted,

EDWARD B. SHAW, Chairman
PRESTON A. MCLENDON
HOWARD J. MORRISON
WYMAN C. C. COLE

The Academy Study of Child Health Services

Dear Dr. Veeder:

It has become customary for a monthly report to be submitted to the JOURNAL OF PEDIATRICS by the Executive Staff of the Study of Child Health Services. During recent weeks, or, more accurately, months, the measure of our progress has been the number of drafts of a preliminary report of the pilot study in North Carolina that have been written, revised, discarded, and rewritten. The pressure of activity has been such that I have no formal report to present at this time. Perhaps you would consider it appropriate to publish this letter lest the impression be gained that the executive staff has paused in its progress toward the goal of completing the whole study at the earliest possible date. The truth of the matter is that the lights from our new offices on Massachusetts Avenue have been burning day and night and our whole staff has been busy grinding down the North Carolina data into tables, charts and maps.

At present writing a preliminary draft of the statistical analysis of the North Carolina material has been prepared for submission to the Executive Board of the Academy, the Committee for the Study of Child Health Services, and the Advisory Committee, and for distribution to state chairmen and the North Carolina Pediatric Society. This preliminary draft has been prepared for a twofold purpose: first, to give to state chairmen a preview of the amount and type of information which will be available for all States; and second, so that the committee appointed by the North Carolina Pediatric Society to draw up a final report may select from the formidable array of tabulated material those items which appear important for local planning.

Most of the state chairmen will be familiar with the tables which are included in this draft. These tables constitute a revision of the table forms which were discussed in detail last fall at the regional meetings held in Chicago, San Francisco, and Washington. The data for North Carolina have been entered in these tables and described in detail with the hope that state chairmen will find in this preliminary draft some help in anticipating a report for their own States.

It has not been considered a function of the executive staff to concern itself with recommendations arising from the facts which the Study has revealed in North Carolina. This is a responsibility which belongs to the duly appointed committee which, we hope, will reduce the overwhelming mass of factual data to more appropriate dimensions, as well as prepare the recommendations to serve as a basis for a continuing action program.

It is premature at the present time to quote any of the data presented in the preliminary draft. However, it is permissible to indicate at least the sort of questions to which answers are now appearing for North Carolina. First, a composite picture of the total volume of medical care rendered to the children of the state was obtained to show broad comparisons between areas of differing population, geographic and socioeconomic characteristics. The details of this composite picture were then examined more closely. The number and distribution of physicians and dentists and the extent to which they concentrate in urban areas in North Carolina have been described with the help of State maps. Particular attention has been given to the proportion of medical care and health supervision given to children by general practitioners, specialists and community health agencies. A detailed analysis has been made of hospital care, including all general hospitals which admit children, those which admit maternity cases in order to cover newborn care, and special hospitals, such as communicable disease hospitals, tuberculosis sanatoriums, nervous and mental institutions, and convalescent homes.

It is fair to state that the information now available should serve as a basis for the development of sound plans for the improvement of child health services in North Carolina.

Sincerely yours,

(Signed) JOHN P. HUBBARD.

The Social Aspects of Medicine

In the April, 1946, number of the JOURNAL OF PEDIATRICS (28: 503, 1946) is an article by Prof. A. Lichtenstein of Sweden, giving an outline of the Swedish system of medical care. In the letter from Dr. Donald Paterson appearing in the March, 1947, issue of this journal, reference was made to an article by Dr. Arvid Wallgren appearing in the December, 1946, issue of the *Canadian Medical Association Journal* (55: 605, 1946), describing in detail the education of physicians in Sweden and their various functions and roles in the general plan for medical care. The viewpoint of Dr. Wallgren, that primarily of the physician concerned, and the subject matter of this article are so different from Professor Lichtenstein's that it has seemed advisable to reprint Dr. Wallgren's article here. Obviously the Swedish system of medical care is the result to date of a gradual indigenous growth and development. It obviously cannot be transplanted in toto to our soil any more than can the English constitution. Nevertheless, it has more importance for us than the system of any other country, for in it private practice and State medicine exist all mixed up together, and its general management and control are in the hands of the leading physicians of the country.

If we are to escape from a complete governmental control of medical care, such as would result if the Wagner-Murray-Dingell Bill or legislation of that kind were passed, or from a situation such as is about to be imposed by the Labor Government on the medical profession in England, it will be because we physicians come forward with a constructive program meeting the basic medical needs. These needs are provision for the care of the medically indigent and for medical service in those areas of the country, chiefly rural, where physicians are lacking under the present hit-and-miss system of distribution of physicians. Any program of medical care which will meet these requirements must include Federal and State participation; in other words, what we physicians must do in order to retain the present system of private practice is to supplement it with some form of state-financed medicine, which we ourselves must devise if we are to control its operation. In the Maryland Plan, presented by Dr. Dean W. Roberts in this column (27: 384, 1945), this necessity was recognized, when with the support of the Medical and Chirurgical Faculty of the State of Maryland, the Legislature was asked for money to be used under the direction of the State Board of Health for the care of the medically indigent.

Sweden is a small country, and the Swedish plan may be looked on by us as a pilot experiment which has been conducted along democratic lines in spite of State participation, and which has worked excellently there from both the medical and lay points of view; therefore we can learn much from it even if we cannot copy it in detail. Perhaps its most important feature for us is that in Sweden a mixed system has been eminently satisfactory and successful to the lay public and the profession alike.

Dr. James Wilson in his article in this column (28: 231, 1946) has emphasized the importance of improving the education of physicians in this country as well as increasing their total number. It is interesting to note how much more thorough the Swedish system of education of physicians is than ours. The long years of training are made possible only through State aid to the medical student and later to the young physician while he is still in process of preparation.

SOME ASPECTS OF THE MEDICAL PROFESSION IN SWEDEN*

ARVID WALLGREN, M.D.
STOCKHOLM, SWEDEN

MEDICAL EDUCATION

WHEN the Swedish youth has finished his gymnasium, at which time he is about 19 years of age, and if he intends to study medicine, he has three different medical schools to choose between; the Universities at Uppsala and Lund and the Carolinian Medico-Surgical Institute in Stockholm. The number of students that can be accepted at the beginning of the courses twice a year is limited, 25 at each of the universities and 50 in Stockholm, thus 200 medical students annually. This limitation is partly due to the desire to facilitate the teaching, which aims as far as possible at individual instruction in Sweden, the maxim followed being that the fewer the students the more they learn, and partly due to a wish to produce no more than the required number of physicians. The result of this limitation of the number of medical students accepted is that there is usually fairly severe competition among them; those students who have had the best examination results at the gymnasium, which in general means those who are most ambitious and gifted, are selected. Medical students generally can thus be regarded as a picked group with good intellectual prerequisites to become good physicians.

The medical studies are divided into two separate stages, the pre-clinical and the clinical. The former lasts about 2½ to 3 years, the latter 3½ to 4 years. The student must pass the preclinical examination before he is allowed to attend the clinical classes. During the clinical course he is expected to acquire sufficient practical training to enable him to diagnose and treat patients. After qualifying, he must apply to the State Board of Health for a license to practise medicine. Almost every physician in Sweden endeavours to obtain additional clinical training by serving as an intern for some years after passing his qualifying examination. If he wants to become a specialist he has to study his special field of medicine by practising as an intern for at least 3 years. In addition to his practitioner's license he then has to apply to the Swedish Medical Association for a license as a specialist. There are very strictly regulated requirements for each special field.

One may differentiate between three kinds of physicians in Sweden, *viz.*, the hospital physician, the health officer, and the private practitioner.

The Hospital Physician.—The rapid advance of medical science has compelled an ever-increasing number of physicians to specialize, a development which is making itself apparent also in the hospitals. The hospital system is in a high state of development in Sweden, service of the highest class being given free of cost or at an extremely low charge. Patients pay, as a rule, 2 Swedish

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crowns a day in the public wards and 10 crowns for a private room, this charge being inclusive.* The state or municipality, or the board of the province, is responsible for the covering of all other costs. The total daily costs at a Swedish hospital amount as a rule to 10 to 20 crowns for each bed. With few exceptions the hospitals are either state-run or under communal government.

From an administrative point of view, Sweden is divided into 24 Districts (Provinces), and in the capital city of each Province there is a central hospital with various special departments each with its head physician; in addition to this there are a number of smaller hospitals in the other towns. At the present time, the central hospitals in general are equipped with the following special services, *viz.*, departments of internal medicine, surgery, and radiology, an ear, nose, throat, and eye service, and departments of pædiatrics and of obstetrics and gynæcology. The ultimate aim is to establish also departments of psychiatry and of dermatology, wards for epidemic diseases, and laboratories for medico-physical research. The tuberculosis hospitals are run as separate units having no connection with the central hospitals, but the administrative system is the same. For surgical tuberculosis patients there are a number of State hospitals. Hospitals for the mentally ill are as a rule run by the State, only the leading cities having their own large mental hospital. The care of crippled patients is also a State service, four hospitals for cripples being at present in existence.

The head physician of a hospital is responsible for all activities being carried on in the different departments. He is paid for half-time services and has the right to carry on a private practice in addition to his work as a hospital physician. In most cases the head physician has his private reception rooms at the hospital, which places its premises, instruments, and staff at his disposal for a small fee. At some of the hospitals the hospital physician has the right to decide himself what fees he will take, at others he must follow a scale of charges approved by the General Board of the Provinces and the Swedish Medical Association.

The head physician is bound to treat without special charge all patients at the hospital and in his own department. He controls the admission of the patients and he alone has the right to judge which patients will be admitted. In some hospitals the head physician is permitted to accept a certain fee from patients in private rooms on condition that this fee is offered him, but he may not request payment. At other hospitals this extra income for the head physician is replaced by a certain increase in his annual salary. The social position of the hospital physician is among the highest in the community, his financial situation is satisfactory, and his living standard good. He is appointed from among many applicants by the King's cabinet, the State Board of Health serving as adviser. The Provinces have relatively small possibility of carrying their own candidates in the election of hospital physicians.

In addition to the head physician, all larger hospitals or hospital departments have an associate head physician who has the same salary as the interns but is responsible for part of the hospital activities, has the right to private prac-

*A Swedish crown or krona is equivalent to 28c in Canadian funds.

tice, and can remain in this position for a longer time than the interns. He must have had special training in the particular field in which he specializes at the hospital and he is appointed by the State Board of Health on the recommendation of the head physician and the board of the hospital. This associate head physician deputizes for the head physician and is in charge of the hospital during his absence. It is from among these associates that the future head physicians are recruited. This arrangement with associate head physicians allows the work of the hospital to continue undisturbed, and the head physician is thus relieved of part of his burden. Associate head physicians have an income from salary and private fees, permitting him to raise a family without undue financial worry.

The interns are all full-time paid and are not entitled to carry on a private practice outside of the hospital. They receive about 9,000 Swedish crowns a year in addition to living quarters or a housing allowance, and their financial position is such that they can marry and raise a family. The intern serves as a rule for 3 years or more, but the period of internship is as far as possible limited to 3 years, in order to give a larger number of new graduates an opportunity to receive hospital training. At the present time, the competition for the majority of these internships is severe. The interns are appointed by the Board of Health of the Province.

The health officers working in the service of the State or the municipality and not attached to the hospitals are responsible for the health of the population in the district or town assigned to them. The State health officers receive for their services an annual salary of, on an average, 9,000 crowns and a pension. They are bound to treat patients for a fee approved by the State, which is lower than that received by private practitioners in general and slightly less than the health insurance rates. These officers are also obliged to visit patients in their homes for a certain fixed fee. Another part of their duties is to place their services, against extra compensation, at the disposal of tuberculosis dispensaries, welfare centres for children and expectant mothers, and schools, and to perform vaccinations against smallpox and other infectious diseases. It is also their duty to take charge of patients during epidemics in their district, and to visit, for no extra charge except their travelling expenses, various parts of their district where their presence may be required for investigating the possible cause of epidemics or insanitary conditions reported to the authorities. In each Province there is a chief health officer who is at the head of the other health officers of the Province and has the final say in all health questions in that area. He has a higher salary than the State health officer, and he has very little time for private practice.

There are about 400 State health officers in Sweden at present, but as the field of activity widens and the responsibility becomes too burdensome for one physician the larger districts are being divided, and it is expected that about 300 new posts as health officer will be made available during the next few years. The number of inhabitants in the district of a health officer varies at present from about 2,000 to about 17,000 persons. The financial position of the State

health officer is satisfactory and his standard of living good. The competition for these posts is fairly severe. Until quite recently, health officers have, if anything, been overqualified as regards medical training; it is not unusual to find men with 10 to 12 years of training at different hospital departments behind them, and their medical knowledge is as a rule on a high level. State health officers retire on a pension at 63 years of age.

In the cities, the municipal health officers correspond to the State health officers in the Provinces; in the smaller cities there is only one of these officers, in the larger ones there is a chief municipal health officer who in some instances is full-time paid, and district municipal health officers who are part-time paid like the State health officers and have medical duties and a social position corresponding to those of the latter. Although the annual salary is usually much lower than the State health officer's their incomes are nevertheless good. They are not compelled to keep to any particular scale of charges but in all probability they calculate their fees in most cases to fit in with health insurance rates. They are entitled to a pension, generally 6,000 crowns at 65 years of age.

Some of the district municipal health officers act as medical advisers for the staff of industrial establishments, government offices and institutions, transport concerns, schools and dispensaries, and to organizations for the welfare of mothers and children and municipal child welfare centres. The municipal health officers are appointed by the city board, and in most cases are highly qualified physicians with good incomes and a satisfactory standard of living, and favourable social standing.

The chief municipal health officer in the leading cities does not carry on any medical activities and is not permitted to have a private practice. His work is entirely administrative, and he acts as adviser to the city board. His annual salary amounts to about 20,000 crowns, and when certain paid commissions which more or less automatically fall to his lot to perform are added, his yearly income amounts on an average to about 25,000 to 30,000 crowns.

The head of the central tuberculosis dispensary of the district can also be classed as the same type of physician as the chief health officer. He must be a specialist in tuberculosis, and he is in charge of anti-tuberculosis campaigns in his district. He is half-time paid and can have a private practice. Under him he has local tuberculosis dispensary physicians who are provincial and municipal health officers. All cases of tuberculosis must be reported to the tuberculosis dispensary, which, through its health nurses and physicians, arranges for the inspection of the patient's home environment and sees to it that he receives the necessary medical attention. Tuberculin tests and x-ray examinations (in the case of tuberculin-positive patients) are carried out at the laboratory of the central tuberculosis dispensary. The local tuberculosis dispensary physician receives a certain annual sum for his work.

Besides the position as chief municipal health officer there are a few other research, laboratory, and administrative posts in the kingdom requiring a full-time medical officer such as, for instance, the post of medical superintendent at various scientific institutions and at the different departments of the State

board of health; head medical adviser of schools in some of the leading cities; chief medical superintendent in the various branches of the defence forces; and a few positions in the social services. The total salary, including benefits allowed, amounts on an average to about 25,000 crowns a year. The Swedish Medical Association has strongly opposed every attempt to introduce the fixed total salary principle for physicians doing practical work, such as hospital physicians, and hitherto they have succeeded in carrying their point. It remains to be seen whether this policy can be maintained in the long run in the face of the ever-hardening insistence of the public on full-time paid physicians.

The Private Practitioner.—The third category of physicians in Sweden is the private practitioner. The number of these is small in comparison with other types of physicians. They are mainly to be found in cities and towns, rarely in rural districts. Although the private practitioners are in the main dependent on the income they make from their practice, the majority of them nevertheless have some form of regular annual income from service at various government or private institutions or business concerns. This extra income is probably large enough, in most cases, to cover the rent for living quarters and reception rooms.

The private practitioner's fees are not subject to any fixed rates but are wholly determined by the confidence of the public in the physician in question. If his fame is wide and his reception rooms well-filled the fee can be raised, while conversely, and if there is much competition with other physicians in the district, he must be content with smaller fees, especially at the beginning of his career as a practitioner. The income of some of the private practitioners is therefore low to begin with, and it is not unusual to find physicians of this category in the larger cities whose medical activities show a loss for the first few years.

The private practitioners have in most cases acquired good training subsequent to their medical studies, and a great many of them are specialists. In some branches of medicine, such as pædiatrics, the demand for private practitioners is so great that they can count on a satisfactory income right from the start of their career. In a few exceptional cases they have their own private clinic, where they treat their patients, admit maternity cases, perform operations and so on. In the leading cities there are also private donation hospitals, to which any physician may remit cases and where he may treat his own patient and charge him the fee he considers adequate.

It is among the private practitioners that the widest variations are found with respect to income, living standard, and social position. Some of these physicians, in these respects at any rate, can be compared with hospital physicians and clinical university professors, the majority are on a level with, or slightly lower than the health officers, and some are in a less satisfactory position from several points of view.

Relatively few physicians start their career with the idea of becoming a private practitioner, in spite of the fact that this form of the profession offers the freest scope. Most of them strive to obtain a hospital appointment or a post as a health officer, thus providing a greater degree of security not only during the years when they are able to work, and in case of illness, because a

certain minimum income is guaranteed under all circumstances, but also for their old age, by ensuring a pension. The private practitioner must protect himself against possible loss of income through illness by costly insurance premiums, and he also has to arrange for his own pension.

THE PHYSICIAN AND THE HEALTH INSURANCE FUNDS

There are no physicians in Sweden appointed specially to treat patients belonging to health insurance funds. There is complete freedom as regards the choice of physician, and a person with a health insurance is at liberty to consult any qualified physician, including specialists, he desires. Either the patient pays the fee to the physician and then applies to the sick relief fund for payment, against production of the physician's receipt, of the amount which the Fund allows in accordance with the rate fixed by the Government for the examination and the treatment the patient has received; or the physician sends the Fund a bill for the amount which is due to him according to the same rate. In some cases, as for instance when a specialist has been consulted, the amount allowed by the Fund is lower than what the patient has paid, but as a rule the fee requested by the physician is more or less on a level with the sick benefit. The sick relief fund fixes a certain fee for the first consultation in the physician's consulting room (5 crowns) and for subsequent consultations (3 to 4 crowns); it fixes the fee for a visit to the patient's home, the amount (8 to 20 crowns or more) varying with the distance (8 to 30 kilometres or more) the physician has to travel; and it also fixes a certain additional fee (2 to 20 crowns) for various special examinations and surgical interventions, the rate for each type of examination or operation being specified. On the whole, physicians seem to be satisfied with the sick relief rates; this can also be seen from the fact that the rates approved by the head physicians of the hospitals diverge only very slightly from the rates of the health insurance companies. The rates followed by the State medical health officers are slightly lower than the sick relief rates. The members of the insurance funds are also satisfied with the insurance regulations, as they are at liberty to consult whatever physician they please. At the present time, more than 50 per cent of the Swedish population are entitled to sick benefits, and a proposal has been submitted to Parliament that a bill be passed compelling all Swedish citizens to become members of a health insurance fund.

THE STATE BOARD OF HEALTH

There is no Ministry of Health in the Swedish Cabinet. The part of the health services not connected with university instruction is bound up with the social organism; the university hospitals form part of the ecclesiastical administration. The executive and controlling body of the social administration in the matter of health questions is the State Board of Health, the head of which, or director general, is a trained physician who has under him the heads of various departments (*e.g.* hygiene, hospitals, health officers, veterinary medicine, pharmacy, administration) who are often full-time paid physicians. By their side they have a scientific advisory board, consisting of professors belonging to

the medical schools and in different branches of medicine to whom they can refer more complicated medical questions for deliberation and advice.

The State board of health has many different tasks, but I shall only mention here some of the most important of them and those concerning the activities of the medical profession; the granting and cancelling of practitioners' licences; receiving and judging complaints against physicians; offering suggestions in connection with the selection of hospital physicians and health officers appointed by the Government; consenting to and approving of new posts of this type; examining and giving consent to architects' designs for hospitals; issuing regulations regarding health questions; control of all matters concerned with the combating of epidemics in the kingdom; supervising and saying the final word in all questions of public health and the care of the sick; dealing with medicinal problems and the affairs of veterinary medicine; and assisting the courts in making pronouncements on questions of a medico-legal nature. The care of mental defectives is entirely a Government concern under the management of the State Board of Health. For the performance of scientific investigations the medical board has at its disposal a bacteriological, a chemicolegal, and a pharmaceutical laboratory as well as an establishment devoted to veterinary bacteriology. The State Board of Health works in intimate co-operation with the State Institute for Public Health.

The Swedish Medical Association.—This Association is comprised of 96 per cent of all Swedish physicians. It has an executive committee which holds meetings once a week. The measures taken by this committee are examined by the Board of the Association, which meets as a rule at least four times a year, and which makes the final decision in the more important matters pertaining to the Association. Once a year there is an assembly of the Association, to which representatives are sent from the local medical unions in different parts of the country. The Association has done an enormous amount to improve the financial position of Swedish physicians, and its members are bound to abide by the decisions of the executive committee or the Board. No agreement may be finally settled, and no appointment applied for, without the consent of the Board or the executive committee. When the conditions are unduly bad and unacceptable to the Association the post is not advertised in the *Journal of the Swedish Medical Association,* which is equivalent to announcing that it may not be applied for until the conditions have been approved. This happens time after time, the result being that negotiations are opened up between the representative authorized to act for the Association and those offering the post in question, and in practically every case the outcome is an improvement in the conditions. The position of the Association in this respect is a very strong one, and the discipline among its members good.

The fixing of standards for the training of specialists, and investigating the applications of individual physicians for a specialist's licence, forms an important part of the work of the Association. A high moral and ethical standard among the members of the Association is aimed at by control of their activities through the local medical unions and by criticism and punishment of delinquents. The member's fee is at present 100 crowns a year.

Different categories of physicians are united into professional associations which are included as unions of specialists in the Swedish Medical Association. These professional Associations safeguard the social and financial interests of their members in collaboration with the mother Association. One of these professional associations is the Association of Young Physicians, which comprises nearly one-half of all the Swedish medical men.

MEDICAL SCIENTIFIC SOCIETIES

Good provision has been made for the interchange of scientific ideas among physicians. The Swedish Medical Society, which includes among its members the majority of the physicians in the kingdom, holds a meeting in Stockholm once a week. The city of Gothenburg and the university towns, Lund and Uppsala, also have their own medical societies, and each capital city in the Provinces where there is a central hospital has its own local scientific union holding meetings regularly. The various special branches of medicine have their own societies which are regarded as sections of the Medical Society; they have meetings usually once a month. There are two medical journals published in the Swedish language, the *Journal of the Swedish Medical Association*, and *Nordisk Medicin*, the latter being the organ of the Medical Society. In addition to these there are the *Uppsala Läkareförenings förhandlingar* and the different *Acta* journals (Medica, Chirurgica, Pædiatrica, Oto-Laryngologica, and so on). Once a year, in November, physicians assemble for an annual meeting, the Parliament of Physicians, lasting for three days, at which professional questions and scientific problems are discussed.

The contact between Swedish physicians and their colleagues in the other northern countries is a lively one. *Nordisk Medicin* accepts articles from all the Scandinavian countries in the language of each particular country, the *Acta* publications are shared by all the northern countries in common, and at regular intervals of two to three years congresses are held alternately in the different northern capitals on various branches of medicine. An ever-widening exchange of teachers and students is taking place. No physician with a degree and a licence from one northern country is, however, allowed to practise in any of the other countries.

Postgraduate training is arranged for through annual courses subsidized by the State, which are held in Stockholm and Gothenburg, and in addition to these there are special courses for school physicians, health officers, and other such categories at varying intervals.

Academy News and Notes

NOTICE

Due to the increased cost of running the *American Board of Pediatrics*, the board has found it necessary to raise the application fee to $125.00, effective May 1, 1947.

DEATHS

William Ewing Sinclair of Orlando, Fla., died Dec. 29, 1946.
Charles E. Turcot, of Quebec, Que., died Jan. 8, 1947.
James LeRoy Foster, of Pittsburgh, Pa., died Jan. 16, 1947.
Justin Allis Garvin, Shaker Heights, Ohio, died Dec. 7, 1946.
Ralph E. Pray of Salinas, Calif., died Dec. 18, 1946.

Dr. Harold W. Buchner of Oklahoma City is now the State Chairman for Oklahoma.

Dr. Frazier Binns of Nashville, Tennessee, has been released from service in the Army.
Dr. R. R. Struthers, Montreal, Que., has been released from UNRRA service.

Comment

WOMEN AND CHILDREN AND WAR

Three articles showing the effect of war on women and children appear in this issue of the JOURNAL. They were not accepted for publication with any thought of propaganda, but purely for their scientific value. One describes conditions at Leningrad during the siege by the Axis armies; another, what happened at Budapest when the tables were turned and the Russians overran Hungary; the third, the effect on Holland when the Dutch resistance movement reacted to the German occupation. In the January number there is a brief reference to the effects of the atomic bomb on children in the article by Agerty on Japanese pediatrics.

These reports of what happens to infants and children under conditions of modern warfare give food for thought. It is true our own country was at war, but in the light of what happens in countries where the actual fighting takes place, we had no hardships. In fact, we in the United States as a nation have little realization of what war really means. Let us contrast with these records the infant mortality rate for the United States during the war years.

Year	*Infant Mortality Rate*
1941	45.3
1942	40.4
1943	40.4
1944	39.8
1945	38.3

At this point we leave the reader to his own thoughts.

We hope no one will infer that the lowering of the infant mortality rate in the United States during the war years shown in the above statistics was due to the EMIC program. We raise this point as this inference will undoubtedly be made by those furthering such proposals as the Pepper Bill of the last Congress. Such an inference is intellectually dishonest. So far there has never been produced the slightest evidence to show that the infants of enlisted men who received medical care paid for by the Federal government had a lower mortality rate than infants without such benefits, or that the medical care they received was better than that of infants in general. There were a number of other happenings that took place in the field of health and medical care coincident with this fall in the infant mortality rate during the war years. Among these were a marked decrease in the number of physicians available for civilian medical care, a rise in the venereal rate, in Missouri, at least, an increase in the number of infants under the care of osteopaths, a decrease in the consumption of sugar and fats, gasoline and travel restrictions, preventing vacations and picnics, an increase of women in industry. Take your choice and ride your own hobby. In recent weeks, during the cold weather, having sweated over the bedside in a number of homes with the temperature around 80° F., we have been toying with the idea that the decrease might have some connection with the fuel shortage and restrictions during the war years which prevented the overheating of American homes.

The decrease that took place is the continuation of a cycle that started many years ago and is due to many factors. One of these is the result of the improvement in the education of the public in health matters, but basically it is due to the tremendous developments which have taken place in medical education and science.

B. S. V.